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PYRAMIDS AND PALACES IN AMERICA.

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We are now to take up the study of the pyramids as furnishing another illustration of the beginnings of architecture. It is to be noticed that there were different kinds of pyramids. but they all appeared at a period just following the opening of history and may be regarded as among the earliest structures erected during the historic period, the only exception being those found in America at the time of the discovery, and these may be said to really belong to the historic stage of progress, if not to the historic period. The point which we are to make in connection with the pyramids is that they mark the type of structure and the form of religion which prevailed at the earliest period, but which grew out of the structures and the religious beliefs which prevailed before they appeared. It will be profitable to us to draw the comparison between them and see what points of resemblance and contrasts there are to be found, giving especial attention to the motives and beliefs which resulted in the erection of these massive structures.

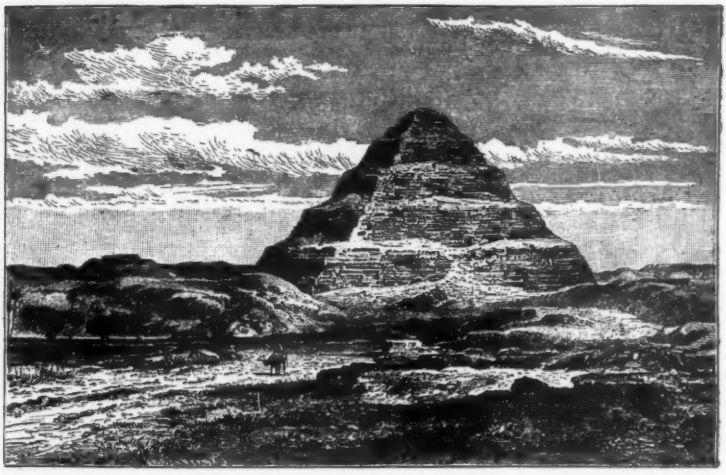
We have shown already that there were rock cut structures and obelisks and altars, as well as tombs, in the various countries of the East, but whether the pyramids preceded or followed these, remains at present uncertain. Still if we take the line of architectural development for our guide, we would naturally conclude that the pyramids were all subsequent to the erection of the rude stone monuments, and these were subsequent to the mounds and caves, the line of succession making it appropriate to consider the pyramids after the ruined cities and the rock cut structures.

In treating of the subject we shall begin with the Pyramids of Egypt and show their purpose, manner of construction, date of erection, and the motive that ruled, and afterward take the pyramids of Babylonia, and follow these with a description of the pyramids of America.

I. Our first inquiry will be in reference to the pyramids of Egypt and the contrast between them and those of other lands. It is well known that the earliest pyramids in Egypt

were erected by a dynasty of kings who had come into power and who brought the people into subjection, so that they were ready to obey their commands, and by this means, the resources of the kingdom were brought under their control. It is supposed also, that the religious sentiment had great sway. These pyramids stand upon the edge of a desert upon the western bank of the Nile, near the point where the river divides into its many mouths or outlets, showing that the dynasty which was in power held control of the lower Nile and were in a comparatively high stage of development.

The three pyramids of Gizeh, called Cheops, Chephrens and Mycerinus, are supposed to be the earliest, though there are many others of these massive burial vaults near the metropolis of the ancient city of Memphis and scattered along the



PYRAMID AT SAKKARAH.

plateau of the Libyan desert for a distance of 25 miles. They were all erected as monuments of the kings and designed to preserve the bodies of the kings in power, and were really burial vaults, though they were monuments to the kings and designed to preserve the body of the kings. It was the belief in immortality that was the ruling motive, but an immortality which consisted in the preservation of the material form rather than the survival of the spirit as separated from the body.

The first requirement for the actual construction of the pyramid appears to have been the leveling of the rock surface. This was followed by the excavation of a subterane-

The form of this pyramid shows that it was modeled after a series of mastebahs, one above another.

an chamber and the erection of a small truncated pyramid or mastabah in the center of the rock. If the life of the king were prolonged, he added new outside layers of stone, following the outline of the first structure, thus enlarging the mastabah or tomb, the pyramid arising in terraces, and really becoming a gigantic mastabah. The opening to the mastabah or tomb was below the pyramid and was reached by a long channel or passageway which had been cut out of the rock.

The size of the pyramids shows the great power which the king had, and at the same time illustrates the mechanical contrivances which were in use at the period. Still the expense of constructing the first pyramid was so great that it nearly exhausted the resources of the kingdom, and the successors to the first monarch were obliged to build on a smaller scale, and finally to cease pyramid building altogether.

The situation of the pyramids marked the dividing line between life and death. On one side we see the River Nile, with the luxuriant fields bordering the river, but on the other side all is desolation and dreary waste. The drifting sand shines under the glare of the noonday sun, dotted here and there with the crumbling remains of ancient tombs. The pyramids were illustrative of the belief of the people. According to this belief every individual consisted of three distinct parts; the body belonged to this world, the soul belonged to another world, and the double which belonged to the two worlds. A double was generally in the form of a statue and was preserved in the tomb. The pyramid itself, however, was the means of preserving the body, and the utmost precaution was taken lest the tomb should be opened and the pyramid be despoiled of the body. There was orientation practiced in connection with this pyramid. It was, however, an orientation which appeared only at the earliest period, an east and west orientation, proving that the worship was in all probability equinoctial, proving also that the erection of the pyramid had something to do with the rising of the Nile and the sowing time, and the harvest time, the inundation of the Nile being the source of life and prosperity to the people. The erecting of the sphinx near the pyramids was also suggestive of the religious belief of the people. It is not known at present what king erected the sphinx, but as it is situated east of the middle pyramid and in the immediate foreground, and was sculptured from the solid rock so as to look toward the rising sun, it is supposed that it was wrought out at the time when the equinoctial worship was prevalent and before the solstitial worship came into vogue.

To the ancient Egyptian the River Nile was a mystery. They believed that a god dwelt within its waters. It was perfectly natural that the temples should be made sacred to the gods which ruled over the waters, and that the lotus plants which grew in the waters of the Nile should be imitated in the pillars that adorned the temples. The trinity of the Egyp-

tian gods consisted of Osiris, Isis, and Horus. The images of these gods were placed in the temples, but there were no images in the pyramids or even outside of them, except the image of the sphinx, which was represented as having the form of an animal with a human head, and was regarded as a symbol of Horus, the early morning sun.

The association of the pyramid and temple is to be considered in this connection. There are temples in Egypt which were erected long after the days of the pyramids, and by dynasties which were entirely distinct from the pyramid builders, but the earliest temples are supposed to have been contemporaneous with the pyramids. The temple of the Sphinx shown in the cut is proof of this. It was discovered in 1853. It lies below the level of the sand and was constructed by the pyramid builder. In a deep well in the corner of one of the rooms were found nine statues of Chepheren or Cheops. The columns of this temple differ from those found in any of the later temples. They are mere massive blocks of granite without ornamentation, and support other blocks which form the roof of the temple; the principle of the pier and lintel being embodied in them but without cornice or capital, thus allying the columns with the architectural structures of the later period*

THE PYRAMID, THE SPHINX AND ITS TEMPLE

The magnitude of the pyramids of Egypt has impressed every one who has looked upon them; and yet the beauty and symmetry of the temples adjoining have called forth the admiration of all; as the contrast between the two classes of works strengthens the impression. This is illustrated by the

*The cut shows the veneering on the pyramid the rock below the Sphinx and the buried temple of the Sphinx.

description which is given of the pyramid, written by Mr. Ebers, the famous Egyptologist, as compared with the description of the temple at Karnak, written by Miss Amelia B. Edwards. Mr. Ebers says:

"We stand before the largest of the works of man which as we know the ancients glorified as one of the wonders of the world. Only by a comparison with other structures present in our memory, can any idea of their immensity be missed. While St. Peters in Rome, is 430 ft. high, the great pyramids of Cheops is 482 ft. high, or 52 feet taller. If the pyramid of Cheops were hollow, the great cathedral could be placed within it like a clock under a protecting glass.

Neither St. Stephen's Cathedral of Vienna, nor that of Strasburg, reaches the height or the largest pyramid, and only the new tower of the Cathedral of Cologne exceeds it. In one respect no other building in the world can be compared with the pyramids, and that is, in regard to the mass and weight of the material used in the construction. If the tomb of Cheops were razed, a wall could be built all around the borders of France. If one fires a good pistol from the top, the ball falls half way down its side. "Time marks all things, but the pyramids mark time," is the Arabian proverb."

The following is Miss Edward's description:

The great hall of Karnak and its columns are enormous. Six men standing with extended arms, finger-tip to finger tip, could barely reach around any one of them. The largest column casts a shadow 12 ft. in breadth. The capitol juts out so high above one's head that it looks as though it might have been placed there to support the heavens It is carved in the semblance of a full blown lotus, and glows with undying colors, colors that are still fresh though laid on by hands that have been dust 3,000 years or more. The beams are huge monoliths carved and painted, bridging the span from pillar to pillar, and darkening the floor beneath with bands of shadow.

Looking up and down the central avenue, we see at one end a flame like obelisk, and at the other a background of glowing mountains; to right and left, and through long lines of columns, we catch glimpses of colossal bas-reliefs lining the roofless walls in every direction. Half in light and half in shadow these slender fantastic forms stand out sharp and clear and colorless. Each figure is some 18 or 20 ft. in height. It may be, that the traveler who finds himself for the first time in the midst of a grove of gigantic oaks, feels something of the same overwhelming sense of awe and wonder, but the great trees have taken 3,000 years to grow and do not strike their roots through six thousand years of history.

Mr. A. H. Keene also says of the construction of the pyramids:

"It was formerly an Egyptian tomb 4 ft. square at the base and tapering up to a point. The Greek term 'pyramid' signifies 'pointed like a

flame of fire.' The pyramids of Egypt are in the first place the tomb of kings. The rise of this type has been ascribed to the 6th or 7th Dynasty, 3400 or 3200 B. C. The Royal pyramids are numerous, but none have been the subject of architectural study except the largest. That of Medum, 400 B. C., seems to have been built over a mastebah, but it was sheathed with masonry, and brought to a point. The great pyramids of Gizeh have been supposed to have gained their great size from continued enlarging and re-casing through a long reign. The pyramids are mainly cairns. They are solid masses of stone or brick, but each has a chamber with several passages leading to them which are carefully concealed, while false passages exist which are intended to deceive plunderers."*

The sides of the three great pyramids of Egypt face the four cardinal points of the compass. Cheops measures 750 ft. on each of the four sides. It is 450 ft. in height, and covers an area of nearly 13 acres. Its estimated weight is about 7,000.000 tons.

There were changes in the construction of the pyramids. The first or oldest is the so called step pyramid of Sakkarah The steps are six in number and vary in height from 38 to 29 feet, their width being about 6 feet. The dimensions are 352x396 feet, and 197 feet high. Some authorities think this pyramid was erected in the first dynasty. The arrangement of chambers in the pyramid is quite special. The claim to the highest antiquity is disputed by some in favor of the "False Pyramid of Medum." This is a step pyramid 115 feet high, and shows three stages, 70, 20 and 25 feet high. This presents the form of the Mastabah more fully than any other pyramid. and shows clearly how the pyramids of Egypt originated The blunted pyramid of Dashur forms one of the group of four, two of stone and two of brick. The dimensions of these are as follows: 700x700—326 feet high; 620x620—321 feet high; 350x350—90 feet high; 343x343—156 feet high. According to Prof. F. Petrie there is a small temple on the east side of the pyramid of Medum. At sunset at the equinox the sepulchre chamber and the sun were in line from the adytum.

The sphinx near the pyramid of Cheops was oriented true east and may possibly be ascribed to the early pyramid builders. It could only have been sculptured by a race with an equinoctial cult. The east and west orientation is seen at the pyramids of Gizeh.†

It appears that pyramid building ceased after the sixth dynasty but was revived in the twelfth dynasty. Just before the Hyksos period King Amenhotep III. returned to the gigantic irrigation works of the pyramid building of the earlier dynasties. Two ornamental pyramids were built, surrounded by statues, and the king himself was buried in the pyramid near the labyrinth.

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*See Stafford's Compendium of Geography and Travel' "Central and South America," by A. H. Keene, London. Stanford & Co. 1901.

†See Dawn of Astronomy, P. 337, by Norman Lockyer.

II. We turn now from the pyramids of Egypt to those of Babylonia, but shall notice the contrast between the two classes. One of the points of difference is found in the manner of orienting the pyramids. Those of Babylonia are oriented towards the solstices, the corners towards the points of the compass. This has been taken by Mr. Norman Lockyer as evidence that the pyramids of Babylonia were older than those of Egypt, as solstitial worship is supposed to be older than the equinoctial.*

He says: "The east and west orientation is chiefly remarkable at the pyramids of Gizeh and the associate temples, but it is not confined to them. The argument in favor of these structures being the work of intruders, is that a perfectly new astronomical idea comes in, as quite out of place in Egypt, with the solstitial rising river, as the autumnal equinox was at Eridu, with the river rising at the spring equinox.

"We are justified from what is now known of the Nile dominating and defining the commencement of the Egyptian year at the solstices, in concluding that other ancient peoples placed in like conditions would act in the same way; and if these conditions were such that spring would mean sowing time and autumn harvest time, their year would begin at an equinox."

There are other evidences to prove that the pyramids of Babylonia were the oldest in the world, while those of Egypt are orientated toward the equinoxes, their sides toward the points of the compass.

The pyramids of Babylonia have a tradition connected with them which goes back to the earliest time. This tradition has been preserved in the sacred Scriptures. Various interpretations have been given to it and to the whole story of the deluge with which it seems to have been connected. According to the celebrated author Ihering, the whole story of the Garden of Eden, the sin of the first pair, the banishment, the contest between Cain and Abel, was a pictorial representation of the progress of society from a primitive condition, up through the various stages. The change from a natural state, where the people fed upon fruits, was followed by the shepherd life, and that by the agricultural or the raising of fruit and grain, a contest occurring between the shepherds and agriculturists all represented by the story of Cain and Abel. The building of the first city was by the agriculturists, but the building of the first Pyramid was to escape the floods to which the valley of the Tigris and Euphrates was subject.

The confirmation of the story is founded on the fact that the first pyramid was actually erected to escape the floods which were so common in the valley of the Tigris and Euphrates. Whatever we may say about the correctness of this interpretation, we must conclude that the tradition at least

*Dawn of Astronomy, p. 366.

favors the extreme antiquity of the pyramids of this locality. The recent discovery by the party sent out by the University of Pennsylvania to explore the ruined cities in the valley of the Tigris, also confirms the theory. The opinion expressed by the chief of the party, Professor Hilprecht, is that the pyramids here were built perhaps as early as 6000 B. C., which would make them two or three thousand years older than those of Egypt. It is true that certain graves have been discovered in Egypt which carry back the date of the first or oldest race to a marvellous antiquity, but the pyramids here were certainly not built before the days of Menes, the first king, and no one claims for his reign a date earlier than 3500 B. C.

It is true that burials which belong to the Stone age have been found in Egypt. They carry us back to a more primitive stage, but the date of the Babylonian pyramids is supposed to be much earlier. The discovery of libraries at Babylonia containing tablets with cuneiform writing upon them carries back the date of the Babylonian civilization much further than that of Egypt and confirms the tradition in reference to the valley of the Tigris having been the original home of the human race.

The fact that the pyramids of Babylonia were built in imitation of mountains favors their antiquity. This confirms the tradition in reference to the ark resting upon a mountain, which shows that the pyramid builders here originally migrated from the mountains. The difference in the construction is to be noticed. The pyramids of Babylonia were ziggurats or towers and not pyramids at all, nor were they used for burial places, but rather the foundation for temples or shrines.

Many differences between the pyramids of Egypt and those of Babylonia may be traced.

1. The pyramids of Egypt were for the most part constructed for tombs and had no buildings upon the summit or in the immediate vicinity. The temple of the Great Sphinx, discovered in 1853 below the level of the sand, was constructed by the pyramid builders. This temple was, however, a tomb as well as a temple. Numerous other tombs of great interest have been discovered near the temples; that of Edtou, the one at Sakkarah, the tomb of Beni Hassen, are supposed to belong to the same period.

2. The pyramids of Egypt were constructed out of heavy blocks of stone which, with incredible toil, were transported from the mountains upon the other side of the river and lifted to their height by mere brute strength. The pyramids of Babylonia were generally constructed out of earth, and were built in terraces; the ends were veneered with stone, pavements of stone being placed on the platforms or terraces, and either palace, or shrine, or temple being placed upon the summit.

3. The pyramids of Egypt were perfect pyramids. They were built in imitation of mastabahs or primitive Egyptian houses, or tombs placed upon one another, thus making terraces, but before they were completed the terraces were filled with stone, and the whole was covered with a veneering of polished flint, which made them perfect cubes. The only room or house about them was on the inside or below the surface. The pyramids of Babylonia on the contrary were always built in terraces and were surmounted by a building of some kind, either a palace, a temple, or a religious house, and were never perfect pyramids. They resembled the pyramids of America much more than they did those of Egypt.

4. Another difference is shown in the fact that in Babylonia the pyramids were all orientated toward the solstices, the corners toward the points of the compass. "It is almost impossible to suppose that those who worshiped the sun at the solstice did not begin the year at the solstice, and that those who proposed to arrange themselves as equinoctials did not begin the year at an equinox. Both of these practices could hardly go on in the case of the same race in the same country. We have then, a valuable hint of the equinoctial cult of Gizeh, which in all probability was interpolated after the non-equinoctial worship had been first founded at Abydos and possibly Thebes."

5. We notice another difference between the pyramids of Egypt and those of Babylonia * "One of the oldest pyramids in Egypt is the so-called step pyramid of Sakkarah. The steps are six in number and vary in height from 38 to 29 feet, their width being 6 feet. Some authorities think that this was erected in the first dynasty by the 4th king, but was built after the pattern of a series of mastabahs imposed on one another. There are 16 step pyramids in the valley of the Nile.

The question has arisen as to the relative antiquity of the pyramids of Babylonia, some having claimed that those of Egypt were the older, but others have given the precedence to those of Babylonia. The best authority, however, is Norman Lockyer, and he maintains that the pyramids of Egypt were built by an intruding race from Babylonia called the "new race," the name being taken from the fact that it was newly round.

The great pyramids of Egypt were built in the time of the 4th dynasty, but two or three distinct periods had passed before this dynasty began. The first period was marked by a people who were in the Stone age.

The second period was marked by the peculiar burials and the peculiar character of relics. The burial was in the circular grave with an immense number of pottery vessels arranged around the bodies, the deposit indicating that the people lived in circular huts.

See Dawn of Astronomy, page 333

The third period was marked by burial in a mastabah or rectangular tomb, built in imitation of the dwelling house of the people, the body being placed in a cellar or well below the house.

The date of the earliest known pyramids in Egypt may be put down as about 3700 B. C. or 4200 B. C. There is conclusive evidence that the kings of Babylon built ziggurats or towers which were in reality step pyramids, as early as 4200 B. C. There was an equality of arts and the possession of similar tools in Chaldea and in Egypt at about the same time.

If this is a correct explanatlon, then we may regard the pyramid at Babylon as a monument of one of the most important events of history, as well as the reminder of a great convulsion of nature.

This does not, to be sure, fully account for the peculiar manner in which the pyramid was built, nor does it account for the fact that the different terraces bore different colors and were sacred to the different planets, the shrine upon its summit being sacred to the sun.

Least of all does it account for the presence of courts and columns and other peculiarities of construction such as have been disclosed by recent excavations. Yet notwitstanding all the discrepancies, the traditions of the past and the explorations of the present have combined to make the spot a memorable one.

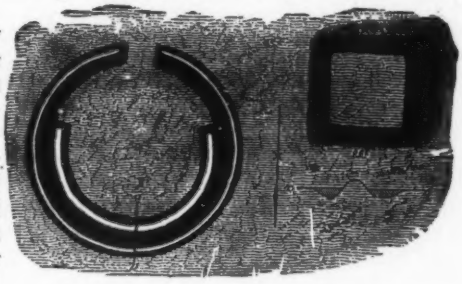
All of these differences seem to confirm the opinion that upon this very spot near the mouth of the Tigris, the earliest civilization appeared, and from this as a center not only the historic but even many of the prehistoric races began their migrations, the tradition of the flood spreading from the center to nearly all parts of the world. It is also the opinion of the best Egyptologists that these and other pyramids in Babylonia preceded those of Egypt, the civilization of this region having reached a high point even when in Egypt the recently found race called the "new race" were in the stage of barbarism which was peculiar to the Stone age, the circular graves and the pottery vessels recently discovered being supplanted by the mastabahs and pyramids which the imigrants from the East had introduced.

It is then to the pyramids of Babylonia that we look for the earliest tokens of civilization and for the earliest record of history.

III. The pyramids of America will next engage our attention, It is well known that there are many pyramids on this continent. Some of them, constructed of earth, are found in the Mississippi valley, others, made out of stone and earth combined, in Mexico and Central America, still others, made out of stone altogether, in Peru; a great variety of shapes being presented by the pyramids here. It has been the favoriite

theory with certain writers, especially the celebrated LePlongeon, that the pyramids of Central America were exactly like the pyramids of Egypt, and were perhaps constructed by a colony from Egypt. In support of this opinion he refers to the various statues which in some respects resemble those found in the valley of the Nile, and claims that even the model of the sphinx has been discovered here. In order to do away with this visionary theory we shall show the probable origin of the pyramids of America.

It was very natural for the people upon this continent to erect pyramids or pyramid mounds for the purpose of raising their houses, and especially the houses of the ruling classes, above the surface, for by this means they could be free from the overflow of the streams, from the attack of wild animals, and from the malaria and heat, which continued upon the surface, and made the nights so uncomfortable and the people so liable to sickness, especially in tropical regions. The largest pyramids were erected here in the same latitude with those of Egypt and Babylonia, and many of the circumstances were similar, but this does not prove any connection between the builders.



PYRAMID MOUND IN OHIO

It is certainly easy to trace a resemblance between the platform mounds and pyramids earth works of the Mississippi valley and the various pyramids of Mexico and Central America for they seem to have been built after the same general model, the terraces rising above one another in succession, with stairways or graded ways leading up to their summits upon either side. Many of them were placed inside of enclosures and had their sides oriented exactly as were the temples and pyramids in the central provinces. These platforms were surmounted by different official buildings.

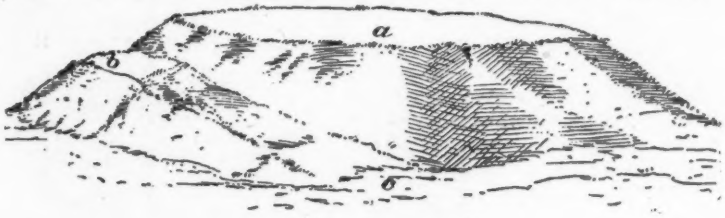
A still more striking resemblance may be found in the so-called Chunkey Yards in the Gulf states, for these were generally placed in the center of the village and were used as the place of amusement for the people, the rotunda being at one end of the public square, and in all these respects resembled the tennis courts or gymnasiums which are so noticeable in Central America the very arrangement of the buildings and the yards suggesting a common origin.

This resemblance however, does not furnish any explanation of the origin of the pyramids in America, nor do they prove that the pyramid builders here have any connection with the

pyramid builders of the old world, but on the contrary they must be taken as another illustration of the law of parallel development, the agricultural life and sedentary state of the mound builders leading them to adopt the same form of religion and the same general customs which were adopted by the pyramid builders in the countries of the East.

It should be said that a theory has been advanced in reference to the pyramids of America which would make them the work of a mysterious race who once inhabited the greater part of the North American continent, and who constructed the platform mounds of the Mississippi valley, and erected the many storied pueblos of the interior, and the lofty terrace pyramids of Mexico, and filled one entire belt of latitude with the tokens of their presence.

This theory, however, would be decidedly misleading, for whatever we may conclude as to the time when this continent was first reached, or as to the direction which the first inhabitants took in their migration, the evidence is that all the struct-

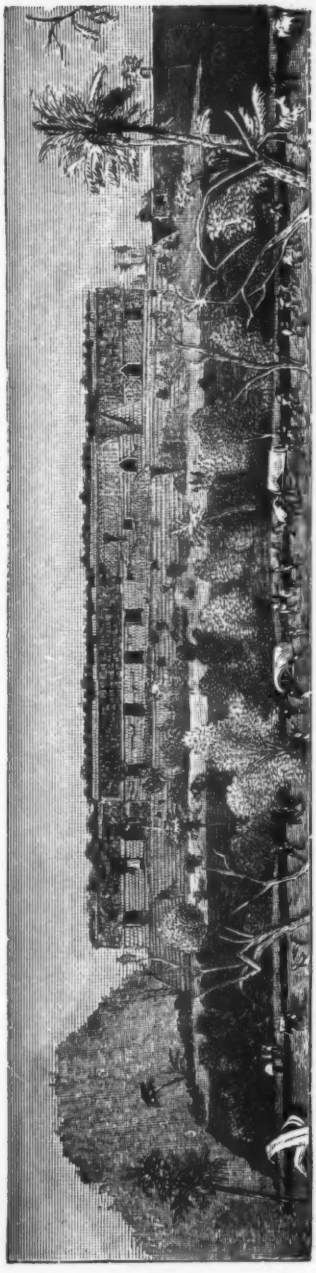


PYRAMID AT ETOWAH.

ures which have thus far been discovered are the works of different tribes and races.

We are to notice, however, that the early stages of architecture are to be recognized on this continent, and what is more, the very influences and causes which led the nations of the East to erect their great pyramids and to make them their chief and most lasting monuments, led the natives of this country to erect their structures which have the pyramidal form. What those influences were is not easily determined. Yet it is probable that the mode of life or occupation, the social conditions, the religious belief and the mythological conceptions had as much to do with the forms of their structures as their mechanical skill had, and to these we must look for our explanation of the pyramids. It is well known that the pyramids of the East were built by an agricultural people who never settled in permanent villages or cities and were generally sun worshipers, and that temples to the sun were frequently associated with the pyramids.

The same may also be said of the pyramids of this continent, for there are no pyramids except in those regions where agriculture abounds, and where sun worsnip prevailed, but pyramids are the most numerous where sun worship and sky



worship prevailed with the greatest force. Many of the pyramids were to be sure erected under the shadow of great mountains, and there may have been an attempt to imitate the mountains in the size and shape of the pyramids, yet we do not learn that there are any shrines devoted to the mountain divinities, as personifications of the sun and moon and the heavenly bodies were very numerous, and nearly all the shrines and temples, as well as the pyramids, were devoted to their worship. In fact we may conclude that the pyramids of America had their origin in the same causes that led to the erection of the pyramids of Egypt and Babylonia, and that the same religious systems were embodied in them that were embodied in the great structures of the East, also those which relate to religions such as sacred places, priesthoods, native pantheons worship, private religion and religious literature are especially pertinent.

The pyramids of America interest us fully as much as do those of Egypt or Babylonia, though less is known concerning them, their builders, or even their history. It is not claimed that they are as ancient as those of the old world, nor is it maintained that as much labor and expense was laid on them, and yet their form and character and the manner of their erection are worthy of especial study.

Some of these pyramide were built in terraces designed for the support of palaces resembling the one shown in the cut which represents the governor's house at Uxmal.

It will be noticed in the first place that there were quite three

distinct regions on the continent in which pyramids were common, and three distinct races who were pyramid builders, the Aztecs having built the majority of those found in Mexico, the Mayas those scattered through Central America, and the far famed Incas having built those found in Peru.

It is to be noticed further that the style of building the pyramids varied according to the locality in which they were found, as those in Mexico are frequently placed upon natural elevations and owe their height to this circumstance, while those of Central America were generally built upon the same level, but reached to different heights according to the purpose for which they were designed, those which were to serve for the support of the palaces were built upon terraces spread over a large plat of ground, those designed for temples were compact and small, but reached a height which overtopped all other structures, while those designed for religious houses or for other purposes, varied in size and height.

There were many terraced pyramids scattered through the country on which large buildings were erected resembling those which were common in New Mexico. These, because of their size and shape, were formerly supposed to be communistic houses like the Pueblos of the north, and the theory was advanced that the people lived in the same manner. This, however, has proved to be a mistake, for all the pyramids of Mexico and Central America, as well as those of Peru, were built and occupied by the ruling class. Their very height and size impressed the common people with a feeling of awe for those who were in power and the many ceremonies which were conducted on the summit of the pyramids served to strengthen the feeling. It was a strange use to make of architecture and of art, and yet there was not a stairway which led up to the summit of a pyramid, nor a figure or ornament on the facade of any palace, or an image on any temple that rose above a pyramid, which did not contribute to the power of the priests and kings and increase the superstition of the people.

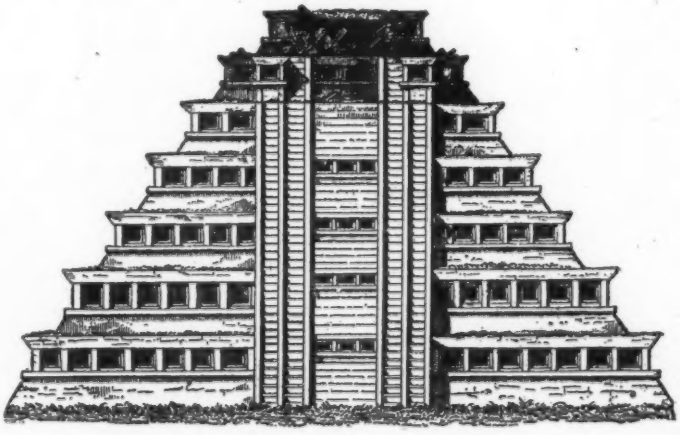
The element of terror was hidden in every ornament which was wrought by the hand of man, and served as a constant guard at the entrance of every temple and palace, the very height of the pyramids on which they were placed making the feeling all the more intense. It was an unconscious influence, for if the sense of the sublime was awakened by the height of the pyramids, the same sense was kept alive by the strange and grotesque figures which appeared on the facades of the palaces and the temples, the very stairways which served as the means of approach being so wrought as to be the most awe inspiring of all.

In this respect we may say that the pyramids of America were in great contrast to those of any other country, for while they were in themselves very plain, and simply served the

purpose of platforms to the temples and palaces, yet the association of the platforms with the buildings upon their summit was so close as to make them appear like one structures The same spirit that pervaded the decorations of the facade also filled the mass of the pyramids which supported them.

These points are to be borne in mind as we proceed, for it is not to the size or strength of the pyramids that we shall call especial attention, but rather to the peculiar mission which they performed in connection with the temples and palaces which were raised above them, the close combination of the buildings with the masses which supported them making them more interesting as objects of study.

As to the pyramids in Mexico, it is very plain that the majority of them were designed for the support of a temple or place of sacrifice, and as the height of the pyramid would make the ceremony all the more imposing and would give such effect to the sacrifice as to overawe the people and make them feel the power of the priests and kings. Thus people



PYRAMID AT PAPANTLA.

sometimes resorted to the mountains and placed their altars upon the heights which overlooked the valleys and there lighted their sacrificial fires. We referred to one such temple in another place. The following is the account furnished by Mr. M. H. Saville:

They are all situated upon the summit of pyramids,but were probably so placed for the sake of escaping the malaria and heat, and taking advantage of the cool breezes which would sweep over them at their height.

About a hundred and fifty miles north-westward from Vera Cruz, fifty miles in the same direction from Misantla, forty-five miles from the Coast, and four or five miles southwest from

the pueblo of Papantla, stands the pyramid shown in the cut, known to the world by the name of pueblo Papantla, but called by the Totonac natives of the region, El Fajin, "the thunderbolt."

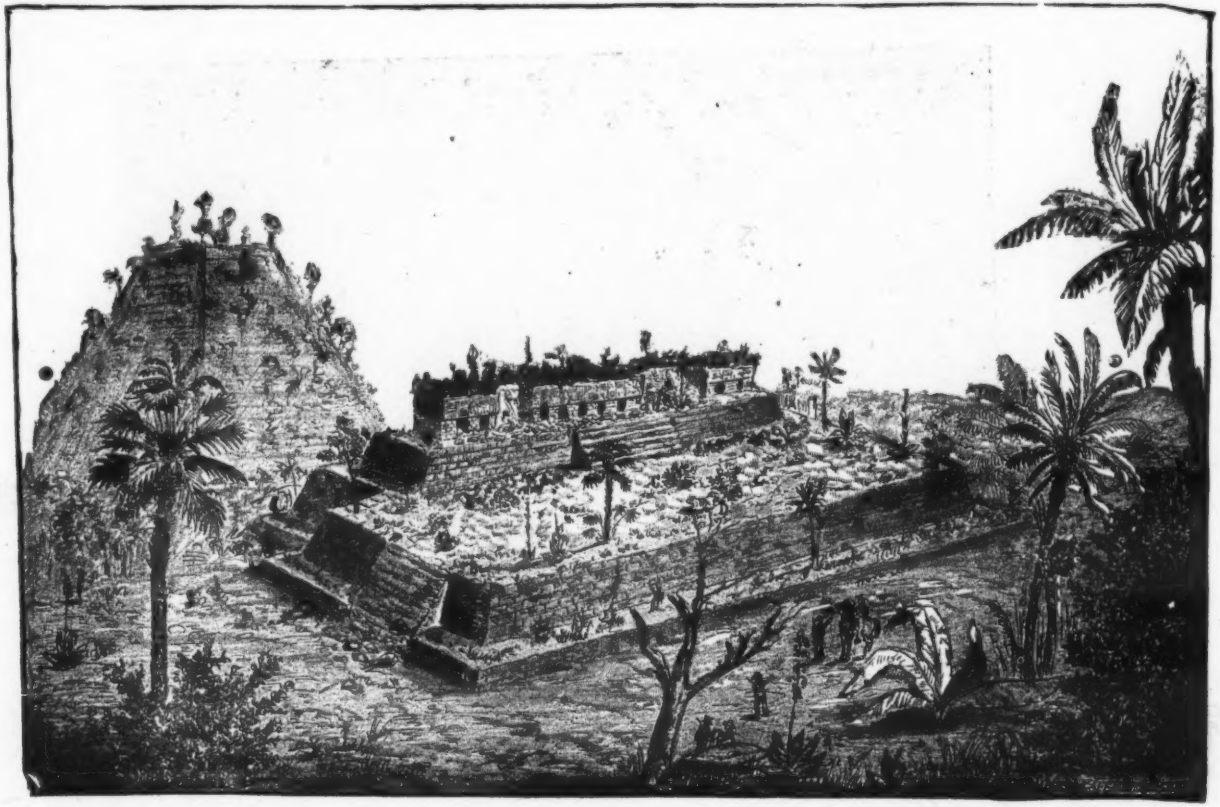
The pyramid stands in a dense forest, apparently not on a naturally or artificially fortified plateau, like the remains farther south. Its base is square, measuring a little over ninety feet on each side, and the height is about fifty-four feet; the whole structure was built in seven stories, the upper story being partially in ruins. Except the upper story, which seems to have contained interior compartments, the whole structure was, so far as is known, solid. The material of which it was built, is a sandstone, in regular cut blocks laid in mortar, although Humboldt, perhaps on the authority of Dupaix, says the material is deposited in immense blocks covered with hieroglyphic sculpture, the whole covered on the exterior surface with a hard cement three inches thick, which also bears traces of having been painted.

There was a temple at Xochicalco, the hill of flowers; this is a natural elevation, of conical form, with an oval base, over two miles in circumference, rising from the plain to a height of nearly four hundred feet. Traces of paved roads of large stones tightly wedged together, lead in straight lines towards the hills from different directions. We find the hill covered from top to bottom with masonry. Five terraces paved with stone and mortar, and supported by perpendicular walls of the some material, extend in oval form, entirely round the whole circumference of the hill, one above the other. Neither the width of the paved platforms, nor the height of the supporting walls, has been given by any explorer, but each terrace, with the corresponding intermediate slope, constitutes something over seventy feet of the height of the hill.

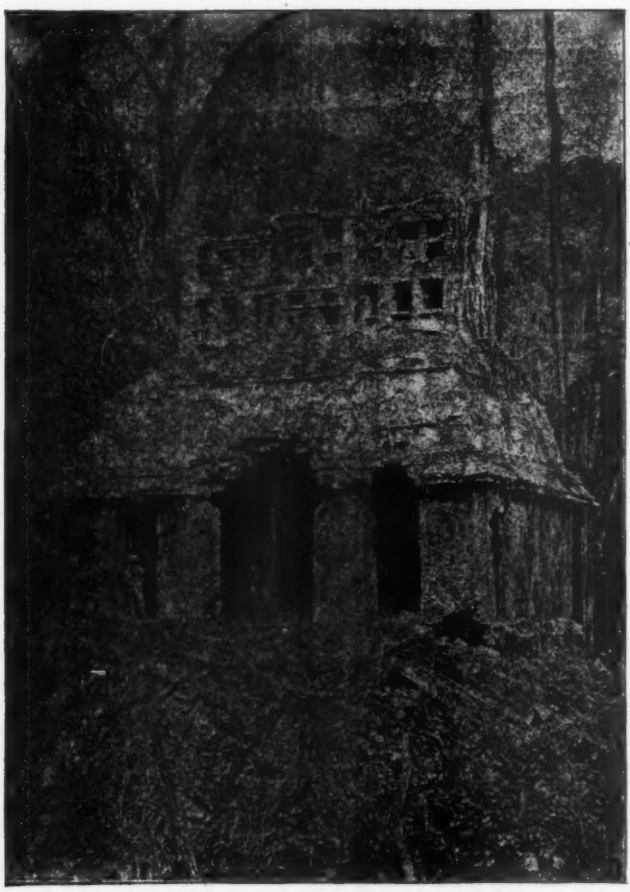
The very fact of its being a pyramid in several stories, gives to Xochicalco, a general likeness to all the more important American ruins. The terraces on the hill slopes have their counterparts at Kabah Cholula, and elsewhere; still, as a whole, the pyramid of Xochicalco, stands above all as its architecture and sculpture, presents a strong contrast with Copan Uxmal, Palenque, Mitla, Cholula, Teotihuacan, or the many pyramids of Vera Cruz. It must be remembered that all the graded temples in Anahuac or Mexico, have disappeared since the conquest, so that a comparison with such buildings as that of Xochicalco is impossible.

In the centre of one of the facades, is an open space, something over twenty feet wide, bounded by solid balistrades, and probably, occupied originally by a stair-way, although it is said that no traces of steps have been found amoug the debris.

The pyramid, or at least its facing, is built of large blocks of granite or porphyry, a kind of stone not found within a distance of many leagues. The blocks are of different sizes, the



PYRAMID AND PALACE AT UXMAL.



TEMPLE AND PYRAMID AT PALENQUE.

largest being about eleven feet long and three feet high, very few being less than five feet in length. They are laid without mortar, and so nicely is the work done that the joints are scarcely perceptible.

It was among the sheltered spots here that, the ancients built their tombs, several of which have been found, being in the form of stone-lined cists. The most prominent peak of this southern range, is at the western end, towering high above the rest, guarding, as it were, the Cuernavaca valley. This mountain is named Chalchihuitepetl, or, hill of the Chalchihuite, the sacred green stone of ancient Mexico and Central America. There are said to be old quarries of it on the southern side of the mountain, which have not yet been investigated.

It was placed on a very conspicuous point upon a mountain height which overlooked a wide valley, the temple itself being built in the form of a pyramid, but with the altar in front instead of upon the top. The temple was divided into two parts. At its entrance were two square pillars, making three doorways, but in the rear was a shrine with hieroglyphics on the walls. There was a fire bed in front of the temple which gives the idea that human sacrifice may have been offered upon this spot, thus making the mountain itself serve the same purpose as an artificial pyramid.*

The eastern end of the temple, shows a structure composed of four parts, the lowest, simply a wide foundation built of rough stones connected together. This serves as a foundation for the second part, the two forming a truncated pyramid. Against the eastern side of the pyramid are the remains of a steep flight of steps; resting upon the lower pyramid is a smaller flight one of the same form. Accordingly we reach the lower platform and, are in front of the old temple, which faced the west. The temple is slightly smaller than the pyramid. Nothing remains of the front wall with the exception of two square columns, showing a wide central door, with a narrow one on either side. This temple is divided into two rooms. At either end of the front room was a narrow bench or seat built against the wall; in its centre was an altar, where the sacred fire was lighted. The importance of this altar, is found in the fact that it was upon the summit of a mountain overlooking a wide valley and was probably used as a place of sacrifice. It is well known that, human sacrifice was practiced by the Aztecs, and that the Teocalli reeked with human gore. The most important feature of the ruin is, the hieroglyphic inscription. This establishes the date of the temple at 1502, A. D.; seventeen years before the entry of Cortez into Mexico. It is one of the few ruined temples which have been discovered, and its discovery shows that the same form of temple architecture prevailed among the Aztecs that had pre-

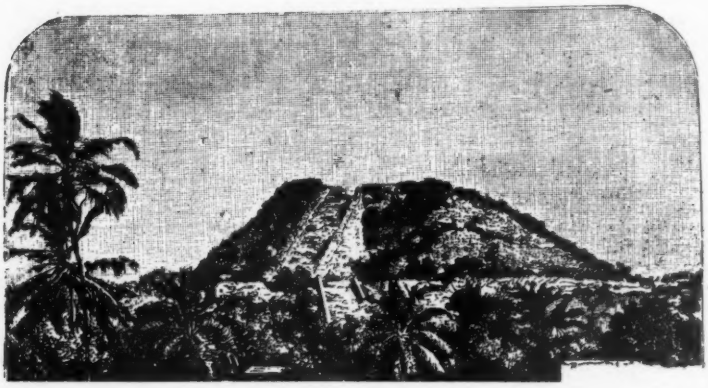
*Human Sacrifices seem to have been practiced by the Aztecs and perhaps by the Toltecs but not by the Mayas.

vailed among the Toltecs, but the temple among the Aztecs was devoted to human sacrifice.

The pyramids of Central America are similar to those of Mexico in many respects, and yet differ enough to warrant a separate account of them.

The cities here, are all very much alike. There was, in each a palace, which was generally arranged in a quadrangle, and furnished with courts and plazas, having wide terraces or platforms, in front of them, while the temples, were single buildings, placed on the summit of a lofty pyramid and, were approached by stairways, some of which were in the shape of serpents, whose heads projected beyond the stairway. There was a slight difference between the temples of the Mayas and Nahuas, but the difference consisted more in the ornamentation than in the construction.

Bancroft says: "Having fixed upon a site for a proposed edifice the Maya builder invariably constructed an artificial

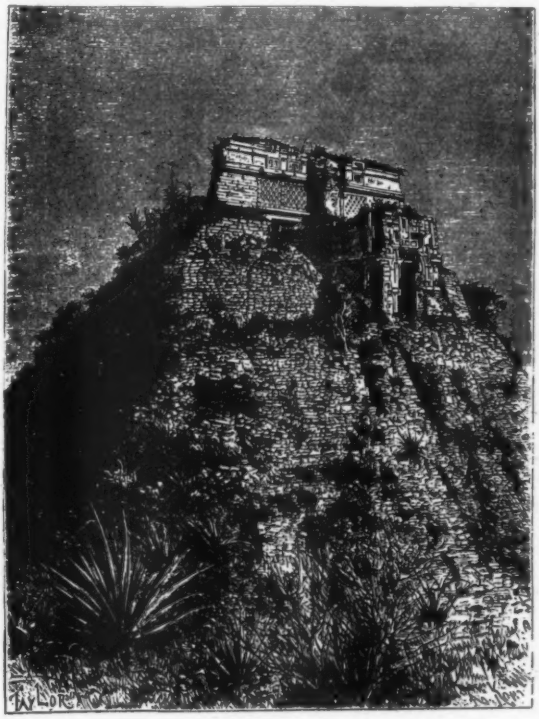


PYRAMID AT IZAMAL.

elevation on which it might rest. If it was a palace or a Nunnery so called, or some other public building, the elevation would consist of a series of wide terraces and platforms, which were surmounted by the buildings which were generally a single story in height, but so covered with heavy cornices and entablatures as to make them appear to be at least two stories in height. The tower in the centre, often arose to a height of three and four stories, thus giving them an imposing appearance. The palaces were generally long buildings, and had many doorways, some of which opened outward toward the terraces; others inward, toward the court."

"All of the pyramids are truncated; none forming a point at the top. A few of them have been found to have contained tombs, which were probably the tombs of kings or priests,

Some of the temples have tombs in the lower stories, with stairs leading down to the chambers. The edifices supported by the mounds, were built upon the summit platform, and, generally, cover the platform with the exception of a narrow esplanade around them. The palaces are built in receding ranges, one above another, on the slope, and are quite imposing in their appearance. One building usually occupies the summit, but in several cases, four of them enclose an interior court



TEMPLE OF THE MAGICIANS.

yard. The buildings are low and narrow. Thirty-one feet is the greatest height; thirty-nine feet the greatest width; three-hundred thirty-two feet the greatest length. The roofs are flat, and like the floors, covered with cement."

The walls are in proportion to the dimensions of the building, very thick, usually from three to six feet, but sometimes nine feet. The interior has generally two, rarely four, parallel ranges of rooms, while in a few of the smaller buildings an uninterrupted corridor extended the whole length. Neither rooms nor corridors ever exceed twenty feet in width or

length, while the ordinary width is eight to ten feet, and the height fifteen to eighteen feet; sixty feet is the greatest length noted. The walls of each room rise, perpendicurlarly, for one-half their height and, then approach each other by the stone blocks overlapping horizontally to within about one foot, the intervening space being covered with a layer of wide flat stones, and the projecting corners being beveled off to form a straight or rarely a curved surface.

This shows the general characteristics of the various pyramids and palaces but we shall need to take specific cases to understand them fully. We have given a number of cuts which illustrate the different pyramids, especially those on which temples were erected. One of them represents the pyramid at Izamal which Charnay visited and has described.

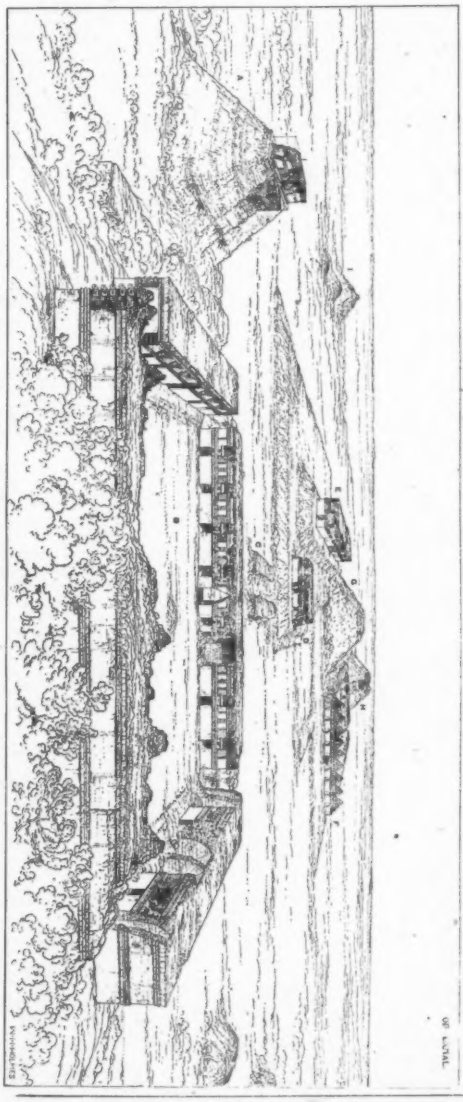
He says: "The great mound is called Kinich-Kakmo 'the sun's face with fiery rays,' from an idol which stood in the temple crowning its summit. The monument consists of two parts, the basement, nearly 650 feet long, surmounted by an immense platform, and the small pyramid to the north. Facing this to the south was another great mound. The third pyramid to the east supported a temple dedicated to Zamna, the founder of the great Maya Empire. The fourth pyramid to the west had on its summit the palace of the 'commander-in-chief of 8000 flints.' On its side near the basement, consisting of stone, laid without mortar, stood the gigantic face reproduced by Stephens. It is 7 feet 8 inches high. The features are rudely formed of small rough stones and afterward covered with stucco. On the east side is the collossal head 13 ft. high, the eyes, nose, and under lip formed of rough stones covered over with mortar, while double spirals, symbols of wind or speech may be seen, similar to those in Mexico at Palenque and Chichen Itza."

The pyramids and palaces at Uxmal are also worthy of notice. They have been described by different writers, among them Mr. J. L. Stephens, Charnay, Mr. W. H. Holmes, Mr. Bancroft and others. Mr. Holmes has furnished a panorama which shows the number and shape of these pyramids, and a general description of them from which we make brief extracts:

"The pyramid Temple of the Magicians (A); the Nunnery quadrangle (B); the Gymnasium (C); the House of the Turtles (D); the Governor's palace (E); the House of the Pigeons (F); and near it the massive pyramid (G); also the temple crowned pyramid (H); and a group consisting of two pyramids (I); and further away ruined masses."

A pyramid at Uxmal is described by Charnay but he calls it the Dwarf's House. He says: "It is a charming temple crowning a pyramid with a very steep slope 400 feet high. It consists of two parts, one reared on the upper summit, the other a kind of chapel, lower down, facing the town. It was richly ornamented and presumably dedicated to a great deity. Two stairways facing east and west led to these buildings."

Of this House of the Magicians (A) Mr. Holmes says: "This temple may well be regarded as the most notable among the group and is the first to catch the eye of the visitor. The temple which crowns the summit is some 70 feet long by 12 feet wide and contains three rooms the middle one being longer than the others.



PANORAMA OF THE PYRAMIDS AND PALACE AT UXMAL.

The Nunnery quadrangle (B) he says, is among the best known specimens of Maya architecture. Four great rectangular structures, low, heavy and formal in general conformation, stand upon a broad terrace in quadrangular arrangement. The terrace measures upwards of 300 feet square. The four great facades facing the court are among the most notable in Yucatan and deserve especial attention at the hands of students of American art. Of the Governor's House he says:*(E) "This superb building crowning the summit is regarded as the most important single structure of its class in Yucatan and for that matter in America. It is extremely simple in plan and outline being a trapezoidal mass some 320 feet long, 40 feet wide and 25 or 26 feet high. It is partially separated into three parts, a long middle section, and two shorter sections, with recesses leading to

*The plate represents the Governor's House and the House of the Magicians.

two great transverse archways. The front wall is pierced by nine principal doorways and by two archway openings and presents a facade of rare beauty and great originality."

"One of the grandest structures in Uxmal is the great truncated pyramid (G) seen in the panorama rising at the southwest corner of the main terrace of the palace. It is sixty or seventy feet in height, and measures, according to Stephens, some 200 ft. by 300 ft. at the base. This author described a summit platform 65 feet square and three feet high, and a narrow terrace extending all around the pyramid fifteen fect below the crest. The surfaces seem to have been richly decorated with characteristic sculptures."

Of the House of the Pigeons(F)he says: "This unique structure is a remarkable quadrangle which could appropriately be called the Quadrangle of the Nine Gables. The court of this quadrangle is 180 feet from east to west and 150 from north to south. Here was a great building of unusual construction and size with an arch opening through the middle into a court bearing upon its roof a colossal masonry cone, built at an enormous expenditure of time and labor."

The pyramids at Palenque are also described by various authors, Del Rio, Dupaix, Waldeck, Stephens, Charnay, Bancroft, and Maudsley. Mr. Holmes has drawn a panorama of this city with its ruined palaces and temples.

He says of the pyramids: "There are upward of a dozen pyramids of greatly varying style and dimensions, eight only retaining the remains of their superstructures. Some are built on level ground and are symmetrical, while others are set against the mountain sides. With respect to the stairways by which the pyramids were ascended Stephens and others seem to convey the idea that the temple pyramids had stairs on all sides covering the entire surface. As stair builders the Palenquians were superior in some respects to the Yucatecs. Some of the short flights which lead from the courts to the adjoining galleries are of special interest."

THE CULTURAL SIGNIFICANCE OF PRIMITIVE IMPLEMENTS AND WEAPONS.

BY ALTON HOWARD THOMPSON, TOPEKA, KANSAS.

PART II. THE PSYCHIC EMERGENCE OF MAN.

The struggles of the first man ape to maintain his existence amid the hostile surroundings in which he found himself, are fraught with peculiar interest, and are even pathetic when we consider the great odds that were against him in the fight. He well employed what gifts nature had bestowed upon him with such skill as he possessed, and by the cultivation of that skill made of himself a new being, who, in the process of evolution, dominated not only over the rest of the animal world but made nature herself his slave.

His own natural weapons of defence, the teeth and claws, were being reduced with a rapidity that must have speedily brought about his extinction, but for the development of the grasping powers of the hand which enabled him to employ the extra-natural resources around him. These natural weapons came in to supplement his own waning powers. The reduction of the jaws, teeth and claws, we can readily perceive, were a correlative variation, due to the evolution of the grasping powers of the hand and the assumption of the erect attitude. From the primitive arboreal prototype it is probable that the later ancestor of man descended again to the earth and became semi-terrestrial in habit, like the anthropoid apes of to-day. But the grasping power of the hand still remained and developed for other purposes than climbing and with its development the seizing and prehensile functions of the jaws and teeth were superceded, and becoming useless, these parts were correspondingly reduced according to nature's well known laws of economy of growth. For, as Darwin well says, (Descent of Man, 562): "As man gradually became erect and continually used his arms and hands for fighting with sticks and stones, as well at for other purposes of life, he would have used his teeth and jaws less and less. The jaws, together with their muscles, would then have been reduced through disuse, as well as the teeth, through the principles of correlation and economy of growth." This correlated variation is one of the most wonderful chapters of human evolution! The jaws and teeth are of such embryonic form in man to-day that some other influence must have supervened to accomplish their reduction, aside from mere food selection. This power in man's primitive, ancestral type, was undoubtedly the developmeut of the grasping power of the hand with the consqeuent relieving of the demand upon the jaws and teeth for fighting, prehension and food seizing. With the evolution of the manual grasping power, an immense resource was placed at the command of pithecanthropic man for combat with his enemies. Indeed, it

was apparently sufficient to enable him to survive in his struggle for existence and was the cause of all his subsequent marvellous evolution. He could not only fight better but he could procure food easier, and this marvellous new faculty thus contributed to the better solution of the two greatest problems of primeval life.

While the ancestral form of man became gradually adapted to terrestrial locomotion, he retained the erect attitude acquired in the arboreal existence of his predecessors. Thus it came about that the upper limbs, the hands and arms, were left free to be employed for other purposes than locomotion. As Charles Morris says, (Man and His Ancestor, 51): "The organization of man renders it questionable if his immediate ancestor was arboreal to the extent of the apes and lemurs. He probably made the ground his habitual place of residence at an early period in his history and that the result of this new habit was a change in the relative length of his limbs, * (56) so that the man-ape was, in his early days, more truly a biped than any of the living apes and lemurs." Unlike the kangaroo, the extinct dinosaurs and other animals which have learned to walk on the hind legs alone, the front limbs were not excessively reduced in man, for the reason that they were gradually diverted to the performance of other services and were kept employed. "It is quite probable that the man-ape, at an early date, became more omnivorous in his diet, that he added flesh food to his fruit and nuts, and this would demand a more active employment of his hands and arms in the capture of animals. This would not fail to modify to a great degree, the use of the arms, and would interfere with their utility in locomotion, so that more and more freedom would be necessary to render them effective."

The original man-ape, the pithecanthropus of the trees, probably chased or sprang after his prey and seized it with his hands: but he also probably discovered, before he became terresterial in his habits, the uses of the club as a missile, and added these resources to his powers of overcoming and capturing living prey. The acquisition of these two habits of life, i.e., the addition of carniverous food to his dietary and his descent to the ground, contributed largely to the evolution of the faculty of employing clubs and stones for striking and throwing, and he thereby became a distinct being. To this shadowy beginning,—when and where we know not,—we owe the beginnings of the divergence which led to the evolution of man.

The most important consideration in connection with the evolution of the grasping power of the hands is, that as primitive man learned to use the club or a stone as a tool or weapon,—even in a simple and automatic way,—and as he came to attempt more precision and skill that these efforts *taught him to think*, and this important result marked the era of his psychic emergence from the purely animal kingdom and his

emancipation from the thraldom of mere animal mentality. The awakening of the consciousness of a desire for greater precision in the use of the hand, acted as a stimulus of the nerve centres controlling motion and these centres became enlarged by the efforts put forth to accomplish the desire. The first observation that a sharp pointed stick was better than a blunt one, and suggested the possibility of sharpening it by hand, was a forward step of the greatest possible importance. It made the difference between the man-ape and the ape-man,—between the mere animal with his automatic mind and the predestined, thinking man. The vital spark that first lit up the mind of pithecanthropic man acted as a stimulus on the nerve substance and it grew, and as it grew he thought more, and as he thought more his brain grew more,—and he became a man. As Prof. J. D. Cunningham has well said, (Proc. Brit. A.A. Science, 1901, SCIENCE, 641): "In man certain parts of the cerebral cortex have been greatly enlarged,—and there is no corresponding increase in the simian brain. I do not think it difficult to account for this important expansion of the cerebral surface. In the forepart of the region involved are placed the groups of motor centers which control the muscular movements of the more important parts of the body.** Within this are the centers for the arm and hand,* and others. In man certain of these have undoubtedly undergone marked expansion. The skilled movements of the hand, as shown in the use of tools, have not been acquired without an increase in the brain mechanism by which these are guided. So important, indeed, is the part played by the human hand as an agent of the mind, and so perfectly is it adjusted with reference to this office that there are many who think that the first great start which man obtained on the path which has led to his higher development, was given by setting his upper limb free from the duty of acting as an organ of support and locomotion. It is an old saying "that man is the wisest of animals because of his hands." Thus the brain received a stimulus by the dawning of the idea of using the hands, with the consequent reactions in both directions, i.e., the increasing of manual skill and the evolution of thought power. For as Prof. Russell, (of Yale College) says, "The manual concept reacts upon the mental concept," and the stimulus is mutual and retroactive. This mutual effect is well understood and is utilized in special fields of training for both the muscles and the brain. It is a well known fact that in dealing with criminals, incapables and defectives in reformatories and special schools for the defective classes, that the training of the muscles is the first step in the process of awakening the dormant powers of the mind. The results of this method have been simply marvellous, as all who are engaged in the blessed work of reclaiming defectives, can well attest. As Dr. E. S. Talbot says, (Degeneracy, 362): "Manual training is a principle long

adopted in idiot schools, where training of certain muscles through both mental and physical methods precedes intellectual training alone." Manual training in the common schools is now looked upon,—and its results well attest its value,—as a desirable, if not necessary adjunct in the work of the awakening and development not only of the physical powers but also the mental life of children. Its effect upon dullards is like an inspiration. The reflex effect upon the brain of manual effort, of the consciousness of manual precision, is well understood where ever displayed. This effect, we are bound to believe, was the potent power that awakened the mind of primitive man, and that his psychic emergence was due to that awakening. From that moment he ceased to be a mere animal and became a man.

(TO BE CONTINUED)

SOUTH AMERICAN ARCHÆOLOGY IN THE AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK.

Hall 308, the South American Gallery in the American Museum of Natural History, New York, contains archælogical collections from Peru and Bolivia, collected by Mr. A. F. Bandelier on expiditions instituted in 1892 at the expense of the late Mr. Henry Villard, and continued for the Museum until 1900; a number of older collections from the same region; collections from Colombia; and archæological material from Brazil.

The greater part of the hall is filled with collections illustrating the various forms of cultures prevailing in the empire of the Incas, which was inhabited principally by two groups of people,—the Kechua and the Aymara. The people inhabiting this empire were tillers of the soil. They raised maize, potatoes, yucca, tobacco, and cotton. They had domesticated the llama, which was used as a beast of burden, and the wool of which served in the manufacture of garments. They were excellent road-builders. Their architectural structures were composed of immense bowlders fitted together without mortar. The arts of the people differ somewhat in different regions.

The railing cases contain objects from the plateaus near Lake Titicaca. In the southern part of this district the Aymara were located, while northward extends the area inhabited by the Kechua.

Typical pottery and wooden vessels, and some coarse fabrics which were used for a mummy covering are here in a wal-

case. On top of the case are a number of large pottery vessels which served as water-jars.

In this district is found pottery painted with delicate patterns similar to those found on woven fabrics. Some of the most beautiful objects made by the ancient inhabitants of this district were wooden vases and cups inlaid with elaborate designs. Shallow stone mortars and slabs for grinding corn were found in great numbers.

Here are also located the ruins of Tiahuanaco, which were deserted at the time of the Conquest. Stones cut in peculiar forms, to be used for architectural purposes, were found here. A model of a monolithic doorway illustrates the type of architecture of this district.

In other railing cases a number of smaller objects, particularly copper pins, small pottery, spindle whorls, and beads, are exhibited. The northern part of the coast was inhabited by the Yuncas where culture differed somewhat from that of the tribes of the interior.

A wall cave contains a number of garments and implements taken from mummies. A tattooing implement is shown in this case, while in Railing Case 9 may be seen the traces of tattooing on a mummified arm. The ancient Peruvians had no system of writing, but used knotted strings as mnemonic aids.

On the mummies were garments made of wool and of cotton, illustrating the style of dress and ornamentation. Numerous bags contained coca, corn, meal, and similar substances, were buried with the mummies.

Mummies of women are accompanied by spindles, looms, and other implements used in their handiwork.

The forms of pottery differ considerably in different localities. In some of these, comparatively simple forms prevailed, while in others imitations of natural objects were most frequent.

At Chapen, Peru, many vases in the form of human heads were found, and others representing frogs, lions, fish, shells, and other animals.

Specimens of beautiful ware in great variety of form and color are here exhibited.

Elaborate ornaments in shell and feathers were worn by the nobility. A remarkably well preserved series of these is shown in this case (the gift of Mr. J. Pierpont Morgan).

A wealth of material was procured from the large graveyard at Ancon, Peru, not far from Lima. A number of complete mummy bundles from this place are exhibited. The Peruvians were in the habit of placing over the mummies false heads, some of which were elaborately decorated. A great variety of utensils and implements used in the industries of the people were found with the mummies.

The burial-grounds of Cuzco and Pachacamac, Peru, yield material of similar description. A number of feather head-

dresses, complete work baskets, black pottery ware, and pouches, deserve special mention.

A number of excellent pieces of pottery, and false heads of mummies, are exhibited.

A well-preserved mummy from Ancon, Peru, and two work-baskets which were buried with it, are exhibited in Case F.

A remarkable collection of beautiful specimens from various parts of Peru, made by Dr. E. Gaffron, was recently secured by the Museum, and is temporarily exhibited. The collection contains the most exquisite specimens of pottery, weaving, work in metal, and of inlaid work.

North of the empire of the Incas was the territory inhabited by the Chibcha and allied tribes. Their culture differed considerably from that of the Peruvians. Pottery, stone-work, and beads, that were obtained from ancient burial-places in northern Colombia from a region that was under the influence of Chotcha culture are exhibited.

The east coast of South America never attained a culture as high as that found on the western plateaus, but the prehistoric inhabitants of the region around the mouth of the Amazon River left behind them masses of pottery of a peculiar type, differing from that made by the more recent inhabitants of that area, and exhibiting excellent workmanship.

The Peruvians were in the habit of deforming the heads of the infants by means of bandages. In cases of sickness they frequently resorted to trephining. Specimens are exhibited which illustrate these customs, and show that enormous portions of bone were sometimes removed.

A number of beautiful pouches were found in a stone chest near Lake Titicaca. The colors and designs are remarkably well preserved. In the same case are seveial ponchos made of feather-work.

Coverings of mummies, two elaborate false heads of mummies, and a number of exquisite specimens of Peruvian pottery collected by E. G. Squier, are exhibited. ANON.

CAVE PAINTINGS IN WEST AUSTRALIA.

BY JOHN FRASER, L. L. D., SYDNEY.

Sir George Grey was one of the Pro-consuls who have done so much to build up the British Empire in distant lands. Whether as Governor of an Australian province or of Cape Colony or of New Zealand, his energetic spirit found employment both in the field of action and in the field of letters. His "*Library of Philology*" is an example of the one direction, and his "*Two Expeditions in North-West and Western Australia, 1837-39*," in the other. While leading one of these expeditions —Capt. Grey he was then—he lighted on the Glenelg River (Long. 125° 10′ E and 15° 45′ S.) which falls into the Western Ocean near that latitude. The ridges and rocks on the river are mostly of sandstone formation, and there are numerous caves. Of these, one which he discovered and entered, presented to the eye and the mind a startling and mysterious appearance. "It was a natural hollow in the sandstone rock; its flow was elevated about five feet from the ground, and something like steps of rock led up to it. The roof was a solid slab of sandstone, nine feet thick, sloping rapidly towards the back. The cave was eight feet high at the entrance. thirty feet wide, and sixteen feet deep.

The cave itself was of little significance, but the flat surfaces everywhere in it—above or end side,—were covered with painted figures, chiefly human, in brilliant colors, red, yellow, blue, black, white. The principal figure was painted on the sloping roof in bright red and white; the neck, shoulders and arms were bare, but the body from the arm pits was clad in a loose gown, like a *Sarong*, with a figured pattern on it. the eyeballs were colored black and surrounded with a yellow oval; there was the outline of a nose, *but there was no mouth.* Another remarkable thing was that this human figure had the face down to the neck surrounded by something like a hood in bright red, and from all parts of the edge of this hood streamed a row of short, sturdy, wavy lines, as if meant to stand for hairs or days. On the left hand side as one entered the cave, were two similar figures with faces, necks, arms and bodies pourtrayed as the other, but not so nicely done; and on the heads of these two were two other faces and heads superimposed. These four faces were each surrounded by narrow hoods in red with a yellow line for a margin, but around this was something like the front view of a wide coal-scuttle bonnet, with a border lined in red. Another like figure, but merely in red outline, is carrying on his hooded head a kangaroo whose body and head and tail are well drawn, and these are carefully and neatly patched all over with red lines. The number of drawings in this cave was about fifty. In the dark recesses at the back of the cave was the outline of an arm and hand in black, but thrown into vivid relief by the rock in the back ground being painted pure white.

Since Sir George Grey's time, other travellers and explorers have found many cave paintings in that region as well as in other parts of Australia; in Queensland for instance. But my purpose to-day is to tell that only last year the Government of Western Australia sent out an expedition to explore the north-west part of the Kimberley Division of that State, and a narrative (with illustrative plates) of that expedition has just been issued. They left Freemantle April 13, fully equipped with pack-horses, stores, astronomical instruments, etc., and were absent nearly seven months. The Naturalist of the party reports that, at a spot near their camp marked FB. 25 on their map,—that is about 70 miles south east from Sir George Grey's cave—they found native drawings on rock-faces in the same style as his. A specimen of these is given here.

He says: "The place was one which had been used evidently for a great number of years for depositing the bones of the dead. It will be seen that the figures are clothed, and all in a similar kind of garment, with what appears like a neck-tie, just below the throat. Curiously this same style of figure similarly dressed, occurred wherever paintings of any extent were found. In all there is the absence of the mouth, and there is what appears to be a halo round the head. These figures agree in these particulars with those found by Grey on the Glenelg in 1837. The colours used are red, yellow, black and white, the black being charcoal and the other colours argillaceous earths, packets of which we found carefully wrapped up in paper-bark parcels in most of the native camps which had been vacated hurriedly owing to our approach. The drawings are finished with greater care and attention to detail than one would expect to find in such a primitive race, and they apparently value them considerably, choosing places, as far as possible, where they will not be injured by the weather. In all the more elaborate drawings the colors appeared to have been simply mixed with water and could be smudged by rubbing with the fingers, but in one or two places on the Glenelg I saw smaller drawings and marks in red, which were made with some other pigment, and were not effected even by wet."

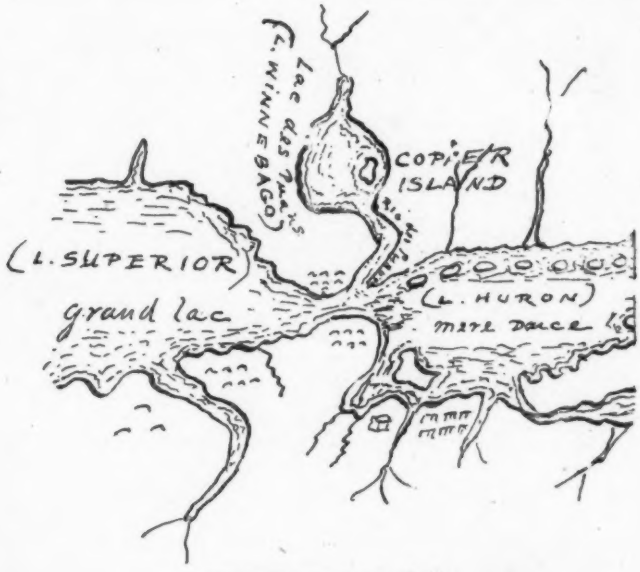
At Camp FB. 49—about fifteen miles south east from Sir George Grey's cave—on Bachsten Creek which flows into the Calder River, they came upon another rich find of drawings of the same kind. The one given here very much resembles another cave painting a long way off, in Queensland, called the Lake of Fire, from a fancied notion that the hands and arms stretching up from the depths are the supplicating members of bodies writhing in pain below.

No sufficient explanation of the origin of any of these paintings has yet been given. In my next communication I will offer my views of the whole question.

COPPER AGE IN THE UNITED STATES.

BY PUBLIUS V. LAWSON.

In North America is found the only pure copper age in the world. The stone age in Europe was followed by the age of bronze, a compound always artificial, metal usually made up of nine parts copper and one of tin. Sir John Lubbock remarks, that the absence of implements made either of copper or tin, proves that the art of making bronze was introduced into, not invented in Europe. Sir Charles Lyell thinks the copper period was short if any. Most European copper implements have been found in Ireland, and yet of 1,300 articles of the



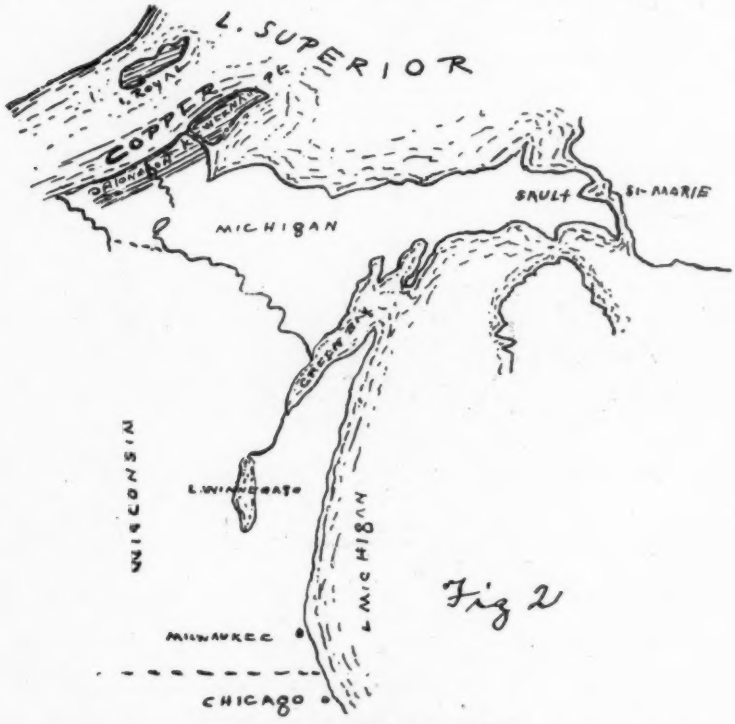
CHAMPLAIN MAP 1632.

bronze age in the Dublin Museum only thirty celts and one sword were made of pure copper. The Roman bronze contained lead. The Etruscans, Phœnicians and Carthaginians had bronze; and Egypt had bronze more than 6,000 years ago. The student of antiquity seeks in vain for the country where the metal worker first changed copper into bronze, or rather seeks the original copper country and the author of Atlantis suggests America.

The Peruvians had bronze. They obtained their tin in Mexico and Chili (Foster). Humboldt analysed a chisel from an ancient silver mine in Cuzco, Peru, which contained ninety-

four parts copper and six parts tin. The Mexicans had bronze, but native copper predominated.

Columbus found in the Gulf of Honduras an Indian canoe; "in which were small hatchets made of copper, also small bells and plates; and a crucible to melt copper": Diaz mentions copper implements on the coast of Yucatan, though no copper exists there. He also records gold and copper trinkets on Cozumel Island near there. The early writers describe the discovery in 1552 in Mexico by Cortez of trinkets made of gold, silver, lead, bronze, copper and tin; bronze axes and



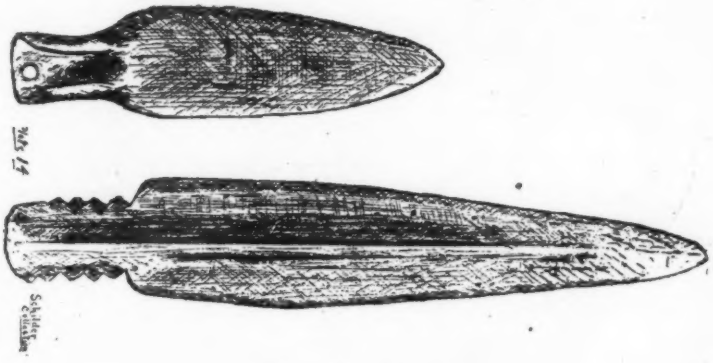
MAP OF NATIVE COPPER MINES.

copper and tin axes. Cortez had cast for his use 8,000 bronze arrow heads within one week by the native metal workers. Copper was cast in a mould. They cast axes, ear-rings and bracelets. Engravings have been published, of ancient Mexican carvings, of the foundry men at work.

There is no evidence of the finding of bronze artifacts in the United States, except in a few instances of undoubted European origin. It is possible that the smithy trade, which is now the occupation of a few among both the tribes of the

Navajos and Pueblos, may have been handed down from vast antiquity; as these sedentary tribes of New Mexico may have learned from old Mexico. These smiths to-day with their rude appliances have great skill. The rude Indians of British Columbia and Alaska who wrought gold ornaments are said to be allied by language to the Navajos.

The Navajo forge can be made upon the ground in a few moments by plastering mud over crossed sticks, and using a bellows made of a goat skin. They forge smelt, cast and hammer. Their crucible is made of baked clay or some fragments of Pueblo pottery, in which to melt their silver or bronze. Hard stones are often used for anvils, and their moulds are cut out of soft sandstone. For fire they use charcoal. (Washington Matthews in Bu. Eth. Rept. 1880-81).



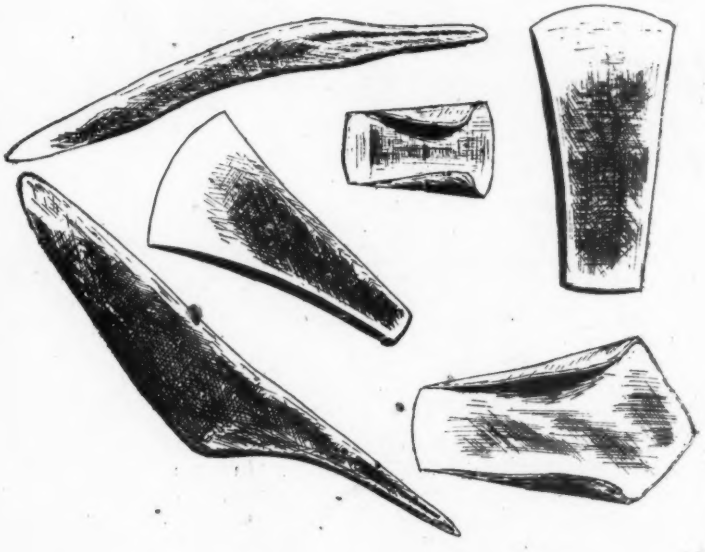
COPPER SPEARS.

Hendrick Hudson learned of the existence of copper among the Indians along the Hudson River. Jacques Cartier in 1534 on the St. Lawrence River, near Montreal, met with the information that "red copper" came from "Saguenay," (which Shea says was the name for the Lake Superior region), and in 1536 he saw a large knife of "red copper" brought by Indians from that region. Brereton relates in 1602 of the Indians of Virginia having great store of copper, observing "there are none but have copper chains, ear-rings, collars arrow-heads and drinking cups covered with copper." Dr. Abbott reports a clay pipe having been found in Massachusetts covered with thin sheets of copper.

In 1610 on the St. Lawrence above Montreal, Champlain was presented by an Indian with a piece of copper, a foot long, which the Indians brought to him rolled in a bag and informed him it was found on the bank of a river near a great lake, where it was gathered in lumps by them, which having melted they spread it in sheets, smoothing it with stones. In

1632, when Champlain made up a map of the lake region, from Indian information, he named Garlic Island in Lake Winnebago, "Copper Island," and located the lake north of Lake Superior. Two years later he sent Nicolet to discover the Chinese Empire on Winnebago Lake supposing the Winnebago Indians were the Celestials, and we suppose he intended to discover his copper island also. Nicolet found the lake but not the copper. Pierre Boucher in 1640 mentions a copper mine on an island in Lake Superior. Roger Williams says of the Indians of Rhode Island: "They have excellent art to cast our pewter and bronze into very neat and artificjal pipes."

Along the North Pacific Coast from Yakutet to Comox, "Coppers" were made in ancient times of native copper, said



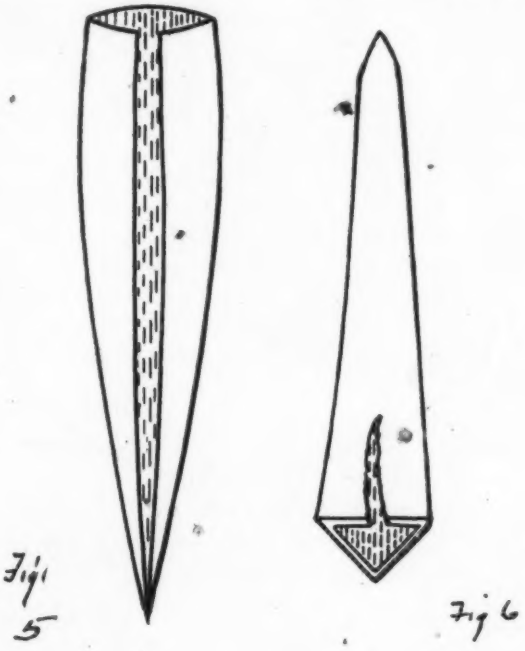
COPPER AXES SPUDS AND KNIVES.

to have been obtained in Alaska, but now obtained of the whites. The Kwakiutl Indians made large thin sheets two feet long by one foot wide into a money or medium of exchange, which were known as "Coppers," and their value was determined by the number of blankets which would purchase them. One of these "coppers" in Fort Rupert iu 1893 had been exchanged for 7,500 blankets, and another had a value of 6,000 blankets. These were blanket values, while their intrinsic value was very little.

There is negative and positive evidence that none of the historical tribes of Wisconsin or Michigan ever worked copper

in any form, but they knew of its existence and had it in their possession. The Jesuit Missionaries, Dablon and Allouez both write of it in the Relations, and seek its source. Charlevoix the historian of New France also mentions it as being treasured as a god, and says: "They made no use of it." Allouez sought its source and frequently mentions it.

None of the explorers, discoverers or missionaries of the Northwest mention any fabrication of copper in any way whatever. Thus it seems that forging copper was a lost art about the west shore of Lake Michigan, in the beautiful oak openings

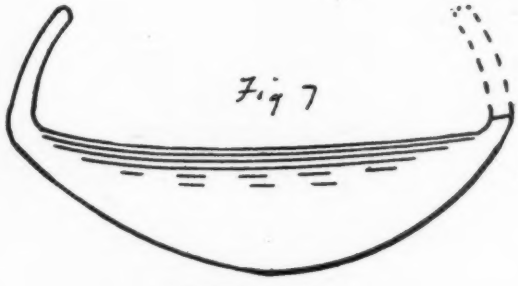


COPPER SPEAR OR LANCE POINTS.

and praries of Wisconsin, when discovered by white men, though the border of lake and stream swarmed with savages who cherished the copper boulders as a divinity, while along the Atlantic sea board and south of the Rio Grande the tribes still knew its value in the arts. However, in pre-Columbian days, throughout Wisconsin the copper smiths swarmed along the border of every river, lake and forest, the symphony of the click, thud, thump of his stone hammer as he fashioned the copper in thousands of forms upon his stone anvil rose

Fig. 5. Javalin, half size. Fig 6. Javalin half size.

with the songs of the hearth and the woodland. They were the clam eater tribes, the effigy mound builder, the men of the fortification mounds, the builders of the truncated, temple, hill and oval mounds. Their earth mounds are found in Wisconsin by the tens of thousands. Their population was numbered by the host who fed off the corn rows which still cover hundreds of square miles of this beautiful country. Their lost or abandoned copper implements are found in every cabinet. Their number is legion. From Wisconsin the copper tribes traded in their copper wares to the furthest limits of the United States and Canada. They were the Phœnicians of the New World. Mexico obtained its copper from them. In return these copper kings lined their cabins with the best of savage days; with the loot of the finest stone and other savage artifacts from near and from far. They obtained the Chalcedony, Jasper and flint from all parts; the



COPPER KNIFE.

shell and wampum from the Atlantic and the Gulf; Obsidian from Mexico and the Rocky Mountains, Pipe stone from Minnesota, Ivory from Greenland. Thus it happens that living in a most beautiful land barren of most of the material from which to fabricate implements of war, the chase and adornment which give the savage his only chance for future fame, by the magic trade of red copper, they left behind them a mine of Archæological wealth which is the wonder and admiration of all.

Wisconsin soil contains an abundance of copper in boulders, stringey masses and aboriginal artifacts. Every farmer finds from one to a dozen pieces varying in weight from a pound to several hundred pounds. Every foundry purchases numerous solid boulders of native copper annually. Even fifty years ago Dr. Lapham reported several hundred pounds annually taken in by foundry men in Milwaukee. Every junk dealer can relate his experience with the numerous pieces purchased along

Fig. 7. Meat chopper, one-third size.

the country roads. Every relic hunter has these pieces of float or glacial copper in abundance. Only a portion of Wisconsin is farmed as yet. When the Northern country, fast opening up to agriculture, makes its report; the annual yield will be beyond belief.

The copper boulders were torn from their place in the Huronian trap of Northern Michigan, when the great glaciers with their miles of ice crushed down over Wisconsin and crumbling away the gangue rock left the copper free. It was spread by the

Fig 8

COPPER KNIFE.

glacier into Indiana, Ohio, Illinois, Iowa, Minnesota and Michigan. But Wisconsin being directly south and nearer to the source retained the most of it. It is found wherever the glacial drift lies, and all through the drift.

One boulder reported from Dodge County weighed 487 pounds, and it is common to find them weighing one or two hundred pounds. The one in the cut weighs forty-six pounds. Boulders have been recovered in Michigan nearer the vein weighing several tons. One such weighing three tons is now

Fig 9

SNAKE PENDANT.

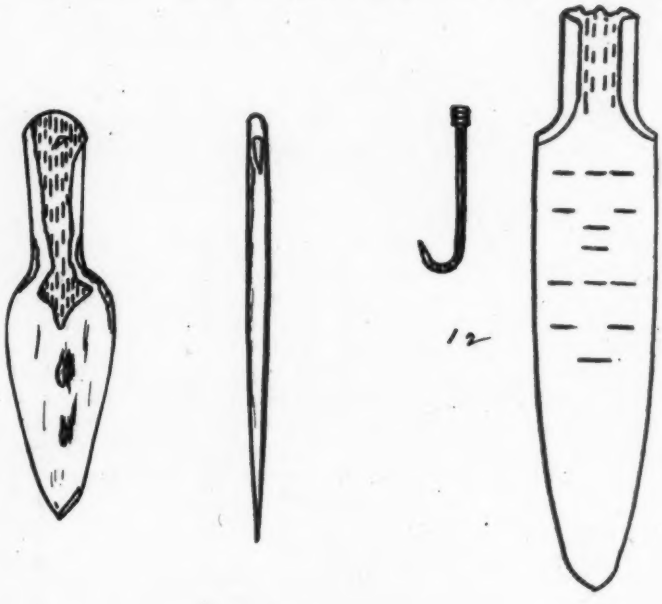
lodged in the National Museum, having cost five thousand dollars to recover.

The southern shore of Lake Superior presents some of the most picturesque scenery in the world. For one hundred and fifty miles it is made up of jagged bluffs composed of alternate layers of trap beds, and red sandstone conglomerate of the Lower Silurian age. Associate with these beds are veins of native or nearly pure copper, sometimes running with the

Fig. 8. Knife, half size. Fig. 9. Snake pendent, full size.

formation and often cutting across. It occurs in great masses of pure copper, and sheets as well as strings and grains. One great sheet of copper opened to view in mining was forty feet long and weighed two hundred tons. (Dana).

Keweenaw Point (which extends into the lake from Northern Michigan) and Ontonagon are the great mining centers, eighty miles long. Isle Royal near the opposite shore, is the same geologically. Native silver, chemically pure, is frequently embedded in the copper in the form of white blotches

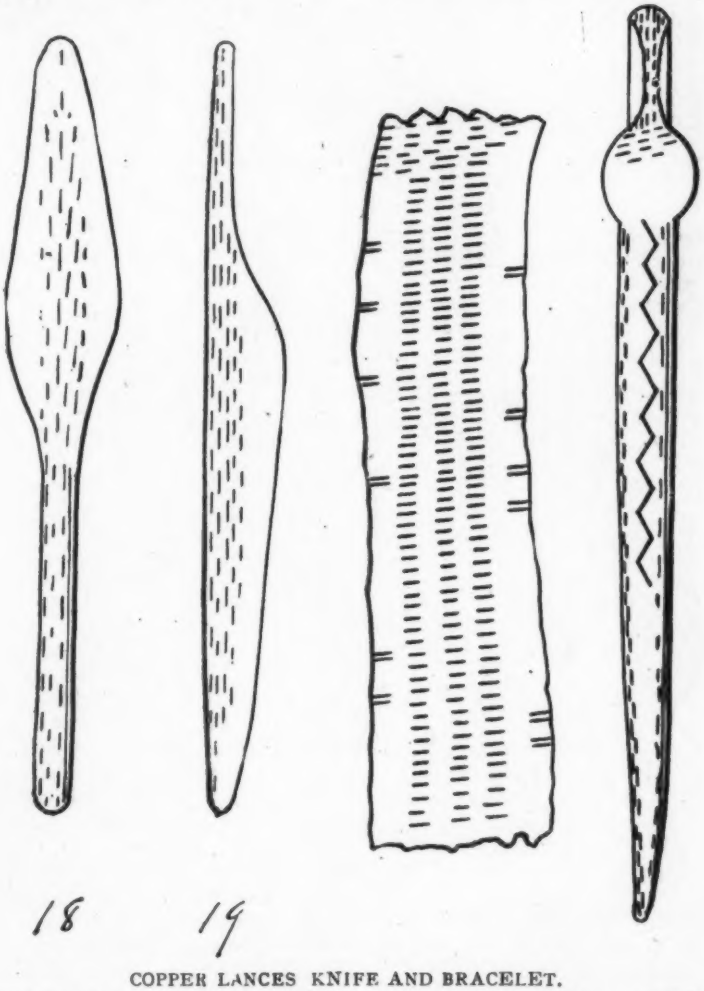


JAVELIN, NEEDLE, AND FISH HOOK.

or fibres or grains, not alloyed, sometimes an inch or more across. Some specimens are spotted white with the more precious metal. Native copper is not mined elsewhere in the United States, and no other location on this continent furnishes copper with visible silver. For this reason, the native copper for the hundreds of specimens discovered in the mounds as far south as Florida which contain visible silver was obtained at the lake. By extensive analyses caused to be made by Mr. Clarence B. Moore, of specimens of the copper art obtained from aboriginal graves in the mounds of Florida; Little Etowah mounds of Georgia; stone graves of Tennessee;

Fig. 10. Lance point, full size. Fig. 11. Sewing needle, many found in sand dunes on Lake Michigan. Fig. 12. Fish hook, commonly found with needles. Fig. 13. Lance point, with thirteen record marks.

the Hopewell mounds of Ohio; float copper of Illinois; and numerous specimens of mined copper from Lake Superior, it was well determined that the undoubted source of most of it, and the probable source of all of it was the native copper deposit of Lake Superior. Lake Superior native copper alone,

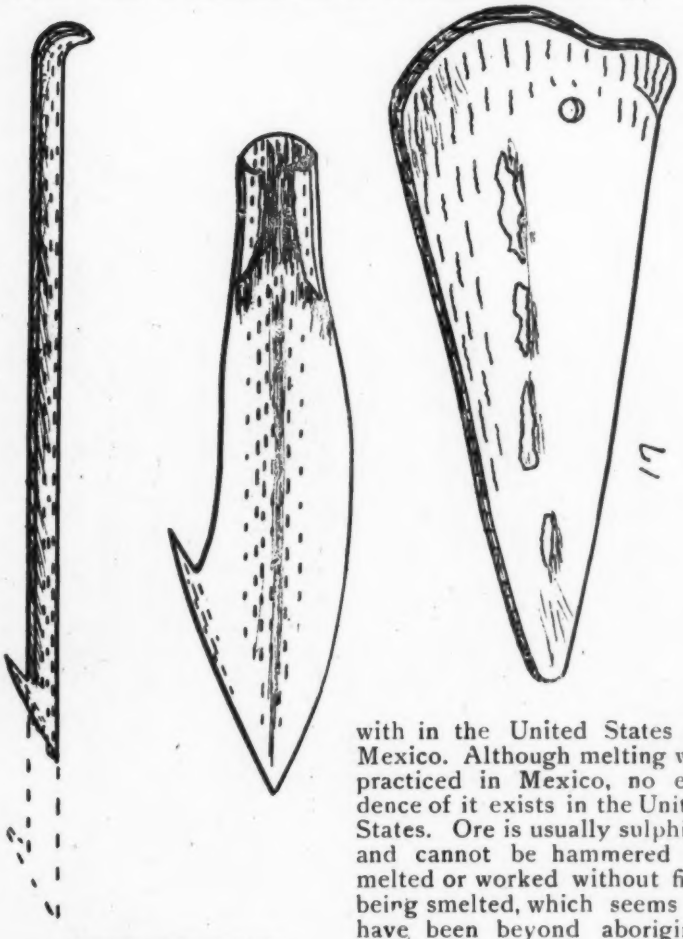


COPPER LANCES KNIFE AND BRACELET.

contained all the characteristics of mound copper. All the specimens contained copper, silver and iron, and no lead. No

Fig. 18. Javelin with long tang, half size; Fig. 19. Remarkable knife 18 inches long.
Fig. 14. Fragment of bracelet with incased dots. Fig. 21. Pencil lance with zig-zag decoration.

bronze or brass has been discovered in the United States of aboriginal origin. (Moore, Copper from Mounds, St. John River, Fla.) All other copper in the United States is an ore, which must be smelted, and no evidence of smelting is met with in the United States or Mexico. Although melting was practiced in Mexico, no evidence of it exists in the United States. Ore is usually sulphide and cannot be hammered or melted or worked without first being smelted, which seems to have been beyond aboriginal attainment.



COPPER FISH SPEARS.

In 1848 the evidence of aboriginal mining was discovered. It has since been found to have been carried on extensively along one hundred miles of the shore and on Isle Royal. Most modern mines were first opened by aboriginals. They worked surface veins in open pits and trenches. They excavated vast quantities of rock, reaching in many pits to a depth of sixteen

Fig. 17. Copper pendent full size

and twenty six feet, and often sixty feet. These mines were excavated in the solid trap rock. Heaps of rubble and dirt surround them. On cleaning out there are found copper utensils, knives, chisels, lances and arrow points; stone hammers to break away the matrix; wooden bowls to bale the mines, wooden shovels to clean them; props and levers for handling the rock; and ladders to enter the mines. The gangue or trap rock was broken away by alternate heating, and cooling with water, as shown by masses of charcoal present. The copper was then worried off by hammering and bending. The marks of the hammer is found on fragments remaining in the abandoned mines. In some of these ancient mines were found masses of copper which were too large for the primitive miners to secure. One mass of native copper ten feet long, three feet wide, two feet thick weighed six tons. It rested on billets of oak, which rested on sleepers, and had been raised five feet,

COPPER KNIFE WITH HANDLE.

From an ancient pit of Mesnard mine, a mass of copper had been taken out and moved forty eight feet which weighed 36,000 pounds. In some mines were left pillars and props for the overhanging wall. Ten cart loads of hammers and mauls were taken out of one mine. They were made of greenstone and porphyry boulders. The modern excavators used them to curb up a well.

All of the hundreds of ancient mines were completely filled with wash from the surrounding soil, vegetable mould leaves and rotten trees. Over the debris of one there grew a hemlock tree with 396 concentric annual rings. From appearances Prof. Foster thought they had been abandoned at least five or six hundred years, and possibly much longer; Mr. Henry Gillman estimated seven or eight hundred years; and Prof. Winchell concludes they are later than the Champlain Sea. As

stated above the Indians did not know of them and no tradition survives them. The ancient miner has left no traces of his domestic activities about that country, which has the most delightful weather in summer, but excessively inclement in winter, as the thermometer often reaches fifty and more below zero. From the thousands and tens of thousands of the manufactured copper articles found and being constantly gathered in Eastern and Southern Wisconsin, the number of which far exceeds all those found in all the balance of the United States, (The writer has a list of 13,000 fashioned coppers found in Wisconsin) it is supposed that the ancient miner occupied these lands with his villages and domestic relations, and made summer excursions of three and four hundred miles either by portage in Northern Michigan between the head waters of rivers running north into Lake Superior and south into Green Bay; or made the long canoe voyage via the Sault Ste. Marie. The copper knives and other articles found in the mines resemble those of Wisconsin. The amount of copper taken from these lake mines is simply incalculable. It must have reached into the millions of pounds. Dr. Butler supposes enough to sheath the British navy; Donelly, more than twenty years of modern mining; and Mr. Henry Hamilton estimates enough to fabricate millions of articles. As scientific men and relic hunters excavate more of the mounds, the cupriferous art comes to light, and it is found in the stone graves of Tennessee. It is not found in the Marine shell heaps, nor among the stone art of the River Drift man of the Delaware, nor as a part of the remains of the Cliff Dwellers. The first aboriginal man who followed the receding glacier could have found this native copper and easily hammered it cold into nearly any desired form. It was far easier to work than diorite, porphyry, or flint

Fig 20. Copper axe, half size, with hole in center and pike head.

which lay beside it on the river bank. No possible economy in the selection of materials could prevent the comingling of stone and copper in their handiwork, the moment that the migration of primitive man had reached the boulders of the drift.

From native copper, primitive man has hammered out the adze, celts, axe single and double, gouge or spud, chisels, drills or gravers or awl made square and often long, lance, spear or javeline knives or daggers or swords, gads or wedges, pendants, bracelets, beads, gorgets, and a great variety of trinkets. They used copper rivets to patch or enlarge their sheet copper (Moore); to attach extremities of bracelets (Putnam); and to attach shaft to lance, and many lances still retain the rivets. The copper chiefs of Wisconsin seem to have been peaceably inclined as no evidence of copper shields have been reported, while most of the mounds from Ohio to Florida abound in beautifully figured shields made of sheet copper hammered into bowl shapes and etched with mythologic figures, or carved with geometrical figures hammered in repousse or figure the Swastika. Even the warrior who sleeps in the stone graves had his copper shield. Copper hammered into thin sheets was made into beads; and beads made of wood shell or stone were covered with it. Jaws of animals were covered with it. Copper effigies of serpents, turtles, the cross and other figures were made of sheet copper. There were copper plumbobs (Squier). There were mechanical, domestic, hunting, fishing tools, and arms for war, and articles for personal adornment. The crescent shaped articles so frequently met in Wisconsin are supposed to have been used to arrange the headdress. From Connet mound, Ohio, over 500 copper beads were taken; some cut out of sheet metal and rolled, not joined, others were solid with a hole bored in them. There are found long square and round rods (one was three feet long), and fragments of flat copper. Many pieces of bulk copper, exhibit hammer marks, and cuts of their former owner. The bulk copper boulder in the Figure, has a hatchet cut in one end. Many of the implements have a sharp tang to enter the shaft; and many of them have the sides or butt end rolled over to form a socket for the shaft or handle Some tangs are serrated for the thong used to attach the handle. There are fish spears or harpoons with one or more barbs. The fish hooks often have their ends bent over for strings but no barb. The needles with holes for the thread are interesting. In Wisconsin both the flame shaped and long pencil lances were frequently decorated with indentations in parallel lines. A gouge or spud (which some think was a tanner's tool for scraping hides, and others suppose a carpenter's tool), which is deposited in the Milwaukee Public Museum, is also decorated with these indentations. Dr. Perkins supposed these were record marks, but they seem more like similar decoration effected by aboriginals,

in the notching of the edges of stone arrow points, such as those of Aztalan, and similar notches on the edge of stone gorgets and shell, and the dotting and lining of pottery. In all ages and degrees of civilization mankind seems averse to a plain surface On the back of the above spud there are also zig zag lines from the point to the other end, and the same patterns appear on a long pencil lance. There are some very fine markings on other implements which appear as if made with a file.

Most of these articles are deeply coated with poisonous copper acetate or verdigris which is produced by vegetable acids; or the green coating of carbonate gathered in damp places; or oxidized black; and mostly badly corroded and seemed with these wasting elements. Many of them are reduced to mere films of green carbonate. Nearly all the sheet metal pieces are a bad wreck.

Prescott says: "With bronze tools assisted by silicious dust the Aztec cut the hardest substances." The Author of the "Ancient Cities of the New World," has discovered that in Mexico copper was used by carpenters and joiners while stone was used for carving stone. It would only be possible in the mechanical arts to use copper as a wood working tool. But as they had not then and never had any means of tempering the copper, it was an inferior tool. Dr. Abbot remarks: "Pure copper is not so valuable for cutting purposes as newly chipped or even polished stone." He suggests the copper celts of the Atlantic coast were not designed as weapons or implements, but intended for display on special occasions as dances or religious festivals, and then wrapped and hidden by the owner or special tribal keeper. This may explain why so many coppers such as celts, bracelets, breast plates and even unworked pieces of copper have been discovered enclosed in cloth. Hundreds of specimens have been found in graves and mounds preserved in cloth from oxidation and in return preserving for our astonished admiration the excellent textile fabric of bygone ages. Allouez refers to the Natives of Lake Superior region having bulk float copper weighing twenty pounds. He had seen them in the hands of savages, who held them as divinities, or as presents from the water god. They keep them wrapped with precious things and transmit them to descendants. Copper effigies of snakes, turtles and spools have been found thus wrapped.

Those interested in tracing the territorial limits of the Toltec mythology will note the often recurring emblems or tokens of the Toltec Neptune the god Tlaloc who was adopted by the Aztecs. His symbol was the Cross. A copper Latin cross cut from sheet metal was taken from a stone grave in Tennessee, which resembles cross effigy mounds in Wisconsin. And the serpents so universally adopted in the mythology of all the world, and so often depicted in the sculpture of Central

America where it represents Quetzalcoatl, the god of wisdom, was found hammered from sheet copper in Florida and designed in earth mounds in Wisconsin. So also the turtle represented in Mexican galaxy of gods, is often cut or hammered from copper found in Florida and Illinois mounds, and shoveled into earth effigies in Wisconsin.

There is a popular belief of aboriginal tempered copper. The only hard copper, is an alloy of tin, making bronze, which is not very hard. Lake Superior copper in its matrix is as hard as the ancient implements, and both are harder than the copper of commerce, (Whittlesey). Hammering native copper (Lake copper) hardens it, to heat and plunge it in water softens it. In this it is the reverse of iron. There is no evidence, as

COPPER NUGGET OR BOULDER.

we have stated, that these ancient people ever smelted copper. It was unnecessary as the native copper can be hammered or melted without smelting. Neither is there any evidence that the copper chiefs ever melted copper. The pottery, by recent experiments made by Mrs. S. S. Frackleton of Milwaukee, has been shown to have been burned under a very low heat. Nothing has been found which would answer for a crucible. There was no reason why they did not melt it. Wood will produce a heat of 3000°. Copper melts at 1996° and its silver buttons would melt at 1873° F. The supposed mould marks or sand ridges on corroded copper are only the result of corrosion. Some of these have visible silver specks in them which would be an alloy and invisible if melted. Besides experiments made

with weak acids produce similar mould ridges. There are no two articles the same size, shape or ornamentation; no flow marks of melting; no "tags" or "sprue" seen; no rings or bracelets attached; no round sockets to the implements; no sandstone moulds found; welding and lamination are found in ridge marked copper; wrought copper cannot be mistaken for melted copper. Hammering copper hardens it unequally and oxidation would be irregular, oxidation is even irregular in bulk boulders; no patterns found; chips left in mines give evidence of no melting, as they are best for the purpose.

Neither is there any evidence of soldering or brazing, though silver would have made an excellent brazing material.

All the copper art of primitive man in the United States and Canada has been fabricated by hammering either hot or cold. Numerous breast plates, trinkets, effigies, needles and fish hooks have been cut, hammered or worked out of copper, which has been first hammered into a sheet. But few articles made of such sheets have been discovered in Wisconsin. We have taken the native copper with the gangue or trap rock still filling its cavities, which has been obtained from the Calumet mines, and by carefully hammering down, cold, one of its ragged fingers, drawn the copper out several inches in length and shaped it into half of a primitive spear. The ragged knobs and fingers of copper were turned over into the center core and all beaten down together. By thus doubling the copper into itself, it will not weld cold, and small parts will scale off. By hammering cold it is impossible to obscure the parts doubled over and bring the instrument to a smooth finish in all its parts. Still a fair piece of work can be turned out to compare with much of the aboriginal copper. If all the projections are first cut off, leaving a clean core to work upon, the hammer can then draw it out, shaped into any desired design, and do so while it is cold. Many of the designs have been fashioned in this way. Many coppers are too smooth and homogenous to have been wrought cold. They are free from scale or perceptible lamination and have the regular compact appearance of moulding and casting. Actual trial has however proved that hammering and heating gives it this appearance.

ANTHROPOLOGICAL NOTES.

ALEXANDER F. CHAMBERLAIN.

EARLIEST SARDINIAN CULTURE.—The grotto of St. Bartholomew, near Cagliari was partially explored by Orsoni in 1878. In 1891 Patroni, superintendent of archæological investigations in Sardinia, instituted further researches with interesting results. Patroni concludes, in opposition to Orsoni, whose examination was incomplete, that the floor-structure indicates not several different "civilizations," but one uniform culture only, mixed with superficial debris due to recent habitations Also the finds belong to an epoch anterior to that of the *nuraghi* and represent the oldest vestiges of Sardinian culture. The pottery is rude and primitive *impasto*, heavy in form, and ranging over a few uniform types. The stone implements, all of obsidian, exhibit little variety. The only ornaments found are some perforated shells and fish-bones. The primitive people of St. Bartholomew hunted the hare, boar, etc., and as the osseous remains show, were acquainted with certain domestic animals,—dog, horse, sheep, hog, ox, rabbit. No ashes were found in the grotto, and the "traces of incineration" reported by Orsoni are thought by Patroni to be the result of chemical alterations of the rock. Patroni's account of his investigations is to be found in the "Notizie dei Scavi," for August, 1901. A brief *résumé* is given in "L'Anthropologie" (Paris), Vol. XIII, pp. 112-113.

BULGARIAN BRAIN-WEIGHTS.—In the "Archiv für Anthropologie" (Braunschurig), Vol. XXVI, (1900), Dr. S. Watoff, of the Hospital at Sofia, publishes the results of the examination of 87 brains (men 70, women 17) of mentally and physically normal Bulgarians, together with certain measures of body, head, etc. The average weight of the male brains was 1382 gr. (range 1185-1585) and of the female 1226 gr. (range 1095-1360). Dr. Watoff also examined the brain of A. Konstantinov the Bulgarian *littérateur*, who was assassinated. His brain weighed 1595 gr., ten grains more than any one of the others, and more than any Bulgarian brain yet investigated. Town, country, occupations, age, stature, circumference of head, etc., seem to exert no appreciable influence upon the weight of the brain. The tallest man (1870 mm.) had a brain of 1282 gr. A youth of sixteen had one of 1462 gr. A skull with a circumference of 520 mm. contained a brain of 1450 gr., while one of 550 mm., had a brain of 1260. The lightest and the heaviest cerebellum (138 and 205 gr.) belonged both to brains of 1500 gr. The number of cases studied are too few to justify dogmatic conclusions, but the suggestions are of value.

MAGYARS AND DRAVIDIANS.—In his "Tamulische (Dravidische) Studien," Bálint sought to demonstrate some grammatical and lexical identities between Magyar and Tamul,—between the Finnic and Dravidian tongues. Dr. H. Winkler, whose valuable article on "Das Finnenthum der Magyaren" appears in the "Zeitschrift für Ethnologie" (Vol. XXXIII, 1901, pp. 157-171), holds that all that Bálint has succeeded in proving is that Magyar contains a number of loan-words from Dravidian,—there is no evidence that Magyar is a Dravidian tongue, or that the Altaic and Dravidian linguistic stocks are closely related. These have been borrowed during the residence of the Magyars in the Central Asian steppe-region. During the steppe-life of the Magyars they borrowed likewise from Uigur-Turkic, Mongolic, and Iranic sources. Traces of contact with the peoples of the Caucasus are also present in the language of the Magyars. The "Tamul" words in Magyar are thus, evidence of historic contact not proof of linguistic relationship. They are culture-data rather than language-phenomena. The Magyars are, physically and linquistically a Finnic people. The Magyars of Alföld represent according to Dr. Winkler, the pure type of the race.

CORRESPONDENCE BY REV. JOHN MACLEAN.

MANITOBA HISTORICAL SOCIETY.

This Society whose museum is located in Winnipeg has been doing good service in the history of the North-West by the publcation of papers relating to noted places, old inhabitants, trading posts, mounds, and the native tribes. Some of the members are living in the far north and by their observations are enriching the archives of the Society. Among the trinted transactions may be mentioned "Madame Lefemoinere,, the first white woman in the Canadian Northwest" by Abbe Dugast; "The Old Crow Wing Trail," and "A Longforgotten Fortress" by Sir John Schultz; "Notes and Observations of Travels on the Athabasca and Slave Lake Regions in 1879," by W. J. McLean, "Lake of the Woods" and other interesting papers by Rev. Dr. Bryce. In connection with the library there is an excellent Northwest Department devoted to works relating to the country and the tribes, in which are to bé found some rare volumes. The museum is still in its infancy, but lately there have been added some old coins, stone-pipes, three steel discs from old Hudson's Bay post at Michipicoton, a number of articles illustrating Blackfoot life and customs, some relics commemorating the regime of the Northwest Fur Trading Company in Fort William, and a good eollection of Eskimo articles from the far north.

REVISING THE CREE BIBLE.

The British and Foreign Bible Society is going to issue an edition of the Bible in the Plain Cree, the former version of the Cree Bible being in the Swampy Cree, which is not well suited to the western Indians, whose dialect is the Plain Cree. During the past year a committee has been at work translating the Bible, based on James Evan's syllabic characters, which were used in the former translation. On August 26th the committee met in St. John's College, Winnipeg, for the purpose of examining the manuscripts already finished. and preparing them for the printer, also to arrange for the completion of the enterprise. The sessions lasted about a week. It is expected that the translation of the entire Bible will be ready for the printer in a year from the present time. The Bishop of Athabasca presided at the meetings, and the Rev. Rural Dean Burman was secretary. The members of the committee are: The Metropolitan of Rupert's Land, the Bishop of Athabasca, the Bishop of Moosonee, and others. The Presbyterian Church contributed a manuscript of Luke's Gospel in Roman characters by the late Rev. G. McVicar. Different portions of the Bible have been translated by the respective members of the committee. The Rev. E. B. Glass who had as his portion of the work, the books of Isaiah and Jeremiah, is a good Cree scholar, and the author of a "Primer and Language Lessons" in English and Cree syllabics of forty lessons. This work is intended for students of the language and missionaries who wish to learn the language by means of the syllabics. The lessons embrace all words and expressions necessary in common conversation and ordinary business, every lesson being in Cree with the English explanation. When the Plain Cree translation is completed, another version will be printed in the dialect of the Cree, which is used in Southern Moosonee, using the extended Syllabarium employed by the late Bishop Horden.

NEW DISCOVERIES.

NEOLITHIC WORKSHOP—An interesting discovery of prehistoric remains has been made near Calais. The sand dunes on the sea coast have revealed the presence of ancient soil, with many evidences of ancient man, e.g. a Neolithic Station and Workshop for making flint swords, knives, javelins and arrows.

DRUIDIC CIRCLE called a Bull Ring has been recently explored near the village of Dove Holes, in Derbyshire. It proves to have been a Neolithic Station resembling Stonehenge.

BAALBEC.—The work of exploring this Temple under the patronage of the German Emperor is nearly completed. In the centre of the whole is a great rock altar—rock-hewn, but the later buildings are constructed in the Roman style—a magnificent colonnade being the chief object.

THE LION OF CHERONEA—This monument erected in honor of the heroes who fell in the battle of Thebes against Phillip is to be restored by the Greek Government.

FOUNTAINS AND AQUEDUCTS, ANCIENT AND MODERN.

The comparison of the ancient and modern art and architecture is very instructive. It appears that modern art has come to us from the East, but ancient art and architecture had a separate development and starting points which were as wide apart as the continents of Europe, Asia and America. The American archæologists realize this more than the European. We give below cuts which exhibit specimens of sculpture

placed near certain modern fountains, also specimens of arches found in Spain. These are in great contrast with the sculptured figures and arches which abounded in America in Prehistoric times, and illustrate the point very clearly,

The fountain of the Moor, in Rome, has a group which was sculptured by Bernini, who has been called the "modern Michael Angelo"; he has been criticised in the following language:

"Leaving behind him true principles of art as seen in the antique sculptures and in nature, principles of purity and

simplicity of design, he rushed onward at his own will, mistaking facility and ingenuity for genius, and, wishing to carry grace and beauty beyond their proper confines, his work became full of affectations. The same is true of other artists.

As one critic says, "he suffocated beauty with the luxury of of useless ornamentation." In his later years the sculptor himself acknowledged his mistake and confessed that his early work, before he became so lavish and extravagant in his ideas, was his best.

Sculptured ornaments which adorn the fountains in many of our cities are borrowed from ancient heathenism. There is

AQUEDUCT AT SEGOVIA.

very little that is modern, and even less that is historic, or has any tendency to awaken the historic sense.

The cut illustrates this point. It shows a modern style of Architecture in the buildings, but the figures which are seen in the group are so complicated that an ordinary person would not understand them. More simplicity would undoubtedly be an improvement, or if complicated designs are to be used they should be such as would be understood, and at the same time awaken the historic sense among the people.

The aqueducts of the ancients, however, have a lesson for us. The aqueducts of this country are so plain that they are rarely noticed and are often an offense to the public taste.

The Romans exceeded all other nations in their skill in connecting such works. There were under the Emperor Neroa, no less than nine different aqueduct's, which were afterwards increased to twenty-four, with several channels placed one

above the other, one of which was sixty-three miles in extent. The Aqua Martia contained nearly 7,000 acres. Strabo said that whole rivers flowed through the streets of Rome. The Romans built other aqueducts in their provinces. That of Metz in Belgic Gaul, is among the most remarkable. The aqueducts on the Island of Mitylene, of Antioch, of Segovia of Spain, and of Constantinople, are to be mentioned. The cut represents the aqueduct of Segovia, and shows the manner in which such structures were erected by the Romans.

The comparison of these fountains of modern times with those adorned by the ancient sculptors is instructive. There were in America, fountains and aqueducts which attracted the attention of the early discoverers, some of which have been described, as follows:

"Water was brought over hill and dale to the top of the mountain, by means of a solid stone aqueduct. Here it was received in a large basin, having in its center a great rock, upon which were inscribed in a circle the hierogliphics representing the years that had elapsed since Nezahualcoyotl's birth, with a list of his most noteworthy achievements. * * *

From this basin the water was distributed through the garden in two streams, one of which meandered down the northern side of the hill, and the other down the southern side. There were likewise several towers or columns of stone having their capitals made in the shape of a pot from which protrude plumes of feathers, which signified the name of the place. Lower down, was the colossal figure of a winged beast called by Ixtlilxochetl, a lion lying down, with its face toward the east, and having in its mouth a sculptured portrait of the king; this statue was generally covered with a canopy adorned with gold and feather work.

A little lower yet there were three basins of water, emblematic of the great lake, and on the borders of the middle one three female figures were sculptured on the solid rock, representing the heads of the confederated states of Mexico, Tezcuco and Tlacopan.

Upon the northern side of the hill was another pond; and here upon the rock was carved the Coat of Arms of the city of Tulan, which was formerly the chief town of the Toltecs. Upon the southern slope of the hill was yet another pond, bearing the coat of arms and the name of the city of Tenayuca, which was formerly the head town of the Chichimecs. From this basin a stream of water flowed continually over the precipice, and being dashed into spray upon the rocks, was scattered like rain over a garden of odorous tropical plants. In the garden were two baths, dug out of one large piece of porphyry, and a flight of steps also cut from the solid rock; worked and polished so smooth that they looked like mirrors, and on the front of the stairs, were carved the years, months, day, and hour in which information was brought to King Nezahualcoyotl of the death of a certain lord of Huexotzinco, whom he esteemed very highly, and who died while the said staircase was being built. The garden is said to have been a perfect little paradise. The gorgeous flowers were all transplanted from the distant terra caliente; marble pavillions, supported on slender columns, with tesselated pavements and sparkling fountains, nestled among the shady groves and afforded a cool retreat during the long summer days. At the end of the garden, almost hidden by the groups of gigantic cedars and cypresses that surrounded it, was the royal palace, so situated that while its spacious halls were filled with the sensuous odors of the tropics, blown in from the gardens, it remained sheltered from the heat."

"Montezuma's Baths" have also been spoken of. These were situated upon the mountain top, and were surrounded by

*Bancroft, Vol. II. p. 167-172.

seats which probably resembled those of the Incas in Peru. In connection with them there was an aqueduct that led across the valley.

The following is a description from Bancroft:

"About three miles eastward from Tezcuco is the isolated rocky hill which rises with steep slopes in conical form to the height of perhaps 600 feet above the plain, a portion on the side of the hill is graded very much as if intended for a modern railroad, forming a level terrace with an embankment from 60 to 200 feet high connecting the hill with another three quarters of a mile distant, and then extends toward the mountain ten or fifteen miles distant, the object of which was to support an aqueduct or pipe ten miles in diameter, made of baked clay or blocks of Porphyry.* At the termination of the aqueduct on the eastern slope of Tezcocingo is a basin hewn from the living rock of reddish porphyry, known as "Montezuma's Bath," four feet and a-half in diameter, and three feet deep, which received water from the aqueduct, with seats cut in the rock near it."

Several persons have described this aqueduct, among them Brantz Mayer, and Edward Tylor; and have spoken of the perfection of the work. The seats which adjoined it have also been described by Col. Mayer, as follows:

"The picturesque view from this spot over small plains, set in the frame of the surrounding mountains and glens which border the eastern side of Tezcocingo, undoubtedly made this recess a resort for royal personages for whom these costly works were made. From the surrounding seats they enjoyed a delicious prospect over this lovely but secluded scenery, while in the basin at their feet were gathered the waters of the spring. On the northern slope is another recess bordered by seats cut in the living rock, and traces of a spiral road and a second circular bath, and sculptured blocks on the summit."

Bullock speaks of the ruins of a large building, a palace whose walls still remain eight feet high, and says that the whole mountain had been covered with palaces, temples, baths, and hanging gardens.

There were also other aqueducts which supplied the gardens and fed the fountains which so beautified the various cities. These have been described by the Spanish writers.

Peter Martyr, describing the Palace at Iztapalapan, writes:

"That house also had orchards, finely planted with divers trees, and herbs, and flourishing flowers, of a sweet smell. There are also in the same great standing pools of water with many kinds of fish, in which divers kinds of all sorts of waterfowl are swimming. To the bottom of these lakes a man may descend by marble stepps brought far off. They report strange things of a walke inclosed with nettings of canes, lest any one should freely come within the voyde plattes of ground, or to the fruits of the trees. Those hedges are made with a thousand pleasant devises, as it falleth out in those delicate purple crosse alleyes, of myrth rosemary or boxe, al very delightful to behold."*

"The love of flowers was a passion with the Aztec's, and they bestowed great care upon the cultivation of gardens. The finest and largest of these were at Iztapalapan and Huastec. The garden at Iztapalapan was divided into four squares, each traversed by shaded walks, meandering among fruit trees,

*Bancroft, Vol. IV., p. 525.
*Peter Martyr's Dec V, Lib. ii.

blossoming hedges, and borders of sweet herbs. In the center of the garden was an immense reservoir, of hewn stone, four hundred paces square, and fed by navigable canals. A tiled pavement, wide enough for four persons walking abreast, surrounded the reservoir, and at intervals steps led down to the water, upon the surface of which innumerable water-fowl sported, A large pavilion, with halls and corridors, overlooked the grounds."

DOUBLE HEADED SERPENT AND THE MIGRATION OF SYMBOLS.

The migrations of symbols has been discussed by the Duke de Alviella who reached the conclusion that many of the symbols found in America, came originally from the Asiatic continent; the Suastika, the Cross, being the most notable of the migratory symbols. One other object or symbol is found in America that has heretofore been considered as peculiar to the continent. We refer now to the double headed serpent. There are however some evidences to prove that even this was originally derived from extra-limital sources, or if not the symbol, the idea embodied in it was. All archæologists know that this is common among the tribes of the Northwest Coast, as well as among the more civilized tribes of Central America, and probably signified about the same thing. On the Northwest Coast there are pictures of priests or medicine men, holding the badge of their office. This represents the fabulous double headed snake, that has one head at each end and a human head in the middle, with a horn on each terminal head and two in the middle:

"This fabulous monster was obtained by the ancestors of one clan Kwakiutl tribes as a helper to the tribe, and therefore became the crest. It had the power to assume the shape of a fish. To eat it, to touch it, or to see it, was sure death except to those who enjoyed supernatural help. To them it brings power. Its skin used as a belt, enables the owner to perform wonderful feats. It may become a canoe that moves by the motion of the fins. Its eyes when used as sling stones, kill even whales. Its blood wherever it touches the skin makes it hard as stone. It is essentually the helper of warriors."

This is called the Sisiul; and is often used as an ornament to the person, for belts are made in this pattern with which blankets are held up; knife handles are often carved in this shape. Whether or not the double headed serpent of Central America came from the same source, the resemblance between

*Bancroft, Vol. II., p. 575.

*See Smithsonian Report, 1895, p. 513.

the two is very striking. The fact however that it was a clan emblem and a religious symbol on the Northwest Coast, helps us to understand its significance when seen on the facades of the palaces.

It is noticeable that one ornament in Central America represents two serpents intertwined with the head and tail projecting at both ends or corners of the building, with a human head in the mouth of the serpent or dragon instead of in the center of the body; still there are bars in the form of double headed serpents, with a mask in the center which form a conspicuous ornament over the doors of the palace. These bars have been noticed by all travellers in Central America, and are supposed to represent some inherited symbol, though they probably had become conventional architectural ornaments, possibly symbolizing the sun and the rain cloud. They however resemble the emblem of the double headed serpent which is common on the Northwest Coast, so closely as to suggest the idea that they originally came from that region, or were transmitted from ancestors who had migrated from the Northwest.

It is remarkable that a figure resembling the double headed serpent, is used as a Coat of Arms in Sumatra.

Here there are two serpents with their tails near together and tigers below the serpents. The fact however that it had about the same significance makes it an object worthy of careful study. Mr. Henry O. Forbes says:

"In a very old village I was greatly interested in finding what I may call a "veritable Coat of Arms," carved out of an immense block of wood, and erected in the central position where one would expect an object with the significance of a Coat of Arms would be placed. From what I could learn it had such a significance in the estimation of the chief of the village; for he told me only such villages as could claim origin from some distant village could erect such a carving in their Balai. I am not, however, master enough of the terms of blazury current in the College of Arms to describe it in fitting language. The shield had double supporters; on each side a tiger rampant bearing on its back a snake defiant, upheld the shield, in whose center the most prominent quartering was a floral ornament which might be a sun flower shading two deer, one on each side—the dexter greater than the sinister. Above the floral ornament was a central, and to me, unintelligible half moon-like blazoning. Below the tips of the conjoined tails of the supporting tigers were two ornate triangles, the upper balanced on the apex of the lower. I feel inclined to assert that it is as good an escutcheon and as well and honorably emblazoned, as any that ever emanated from the College; and who dare say it is less ancient?"

What is still more remarkable is that there are houses among the Kwakiutls on the Northwest Coast, on which the same symbol may be seen. The two serpents or the double headed serpent painted over the door. The serpent is here seen as attacked by birds, the crane and the thunder bird on one side, the eagle and the raven on the other side, two human faces on the body of the bird over the doorway. The resemblance of this figure to the Coat of Arms at Sumatra is very striking.

*See A Naturalist's Wanderings, by H. O. Forbes, p. 180.

EDITORIAL.

MAJOR POWELL AND HIS WORK.

The death of Major Powell has made a vacant place in the ranks of the scientific men of the world which will be difficult to fill. A self-made man, who came up from the humble walks of life, and from the home of a preacher of the Methodist Church, has made his mark upon society such as few men have ever made.

He was born in Mount Morris, N. Y., March 21, 1834. His

father was a preacher of the Wesleyan Church in England, but came to America and settled first in New York, afterwards in Ohio, later in Walworth Co., Wisconsin. His early education was fragmentary, and gained mainly in the fields. At the outbreak of the Civil War, he enlisted in the 20th Ill. Volunteers as 2nd Lieut., but became Major in the U. S. Army. In 1867 he was a Professor in Bloomington, Ill., and with a party of sixteen students he crossed the great plains, to Pike's Peak, and afterwards made the famous expedition which no man had

ever dared to undertake through the Grand Canŏn of the Colorado. From Aug. 13 to Aug. 29, the party was lost to the world, but Major Powell and a few of his companions came out famous for the exploit. In 1871, the survey of the Rocky Mountains was undertaken, and the Ethnological Bureau was established. In 1881, Major Powell was appointed Director of the Geological Survey, but continued his work of Ethnology in connection with that of geology.

He was a great explorer and a wonderful organizer, and was so enthusiastic that in the early days of his Governmental work he drew no salary, expended sll appropriations upon the work itself. His greatest achievement was the development of a systematic topographic map of the United States, which became the necessary base for all geologic and scientific study, forestry, irregation and mining. He was able from his standpoint as an explorer and organizer and a scientific man, to turn the attention of the Government to the scientific needs of the country. In the department of Ethnology he was aided by a large number of specialists, and not only made a map showing the location of native tribes, but did much toward the classification of the native languages.

The books which bear his name as Director of the Government Geological Survey, and the Bureau of Ethnology, make a library in themselves, and will serve as reference books for scientific students for many years to come. Few men have ever accomplished as much in the world as he. His work is his monument, and shows to the world how much may be accomplished by one man. The poverty of his early days never seemed to be a hindrance, for he rose from obscurity to the highest honors, and can be accounted a successful man in all he undertook. He learned self-reliance as a boy on the farm; he learned also the art of commanding men when a Lieutenant in the Army; he learned his first lessons in exploring when with a few companions, he passed through the Grand Canŏn. His whole life work was accomplished through the exercise of the same qualities that received their training in this practical way. In his last days he was engaged in the work of classifying the departments of science and thought into a general system, but his best work was in connection with the two surveys.

The portrait given above was taken some ten years ago, and was furnished to the editor by Major Powell himself. It appeared in the XIVth Volume of *The American Antiquarian*, along with a sketch of his life up to that time. Some important work has been accomplished since then, and the facts are concentrated into this short sketch, though the actual products of his life are scattered through many places, and will remain as his monument.

THE INTERNATIONAL CONGRESS OF AMERICANISTS.

One of the most interesting and notable gatherings of Scientific men has just occurred at New York, in connection with the thirteenth session of the International Congress of Americanists. The object of the Congress is to throw light on the archæology, ethnology and the early history of the two Americas. The subjects discussed related to The Native Races, their origin, distribution, language, inventions, customs, and religions; the history of the early contact between America and the Old World; The Evidence of the Antiquity of Man on this Continent; The Decipherment of the Hieroglyphics which have been discovered in Central America; The Character of the Art and Architecture of this Continent; The Mythology of the Native Races, and their Physical Anthropology.

There were present at this Congress, gentlemen who have been engaged in the study of these various topics from Germany, France, Sweden, Holland, Argentine Republic, Mexico, Costa Rica, and from various parts of the United States. The most notable papers were those which had relation to the pictorial and hieroglyphic writings of Mexico and Central America, by Edward Seler; The Rites and Ceremonies of the Ancient Mexicans, by Mrs. Zelia Nuttal; the Mural Paintings of Yucatan, by Edward H. Thompson; The Archæological Researches in Peru, by Max Uhle; The Current Work of the Bureau of Ethnology, by W. J. McGee; The Folk Lore of Northeastern Siberia compared to that of Northwestern America, by Waldemar Bogoras; Star Cult, by Alice C. Fletcher; The Languages of California, by Roland B. Dixon, and A. L. Kroeber; The Archæology of the Delaware Valley, by F. W. Putnam.

The topic that engaged most attention and excited the most interest was the Discovery of the Lansing Skull. This was on exhibition, and discussed by W. H. Holmes, George A. Dorsey, Ales. Hrdlicka, and others. All agreed that the find was a genuine one, and that it was likely to revolutionize the ideas of Scientists in reference to the antiquity of man in America. The skull was pronounced by those who are specialists in anatomy and physical anthropology to be similar to that of the ordinary Indian of the *northern type*, as it is what is called Kumbo Cephalic, or keel-shaped, differing in some respects from that of the southern Indians, which is generally broader and shorter; but the uncertainty is in reference to the age of the deposit in which the skeleton was found. This is a question to be decided by the geologists rather than the archæologists, and fortunately they have taken up the subject thoroughly.

It will be remembered that the archæologists and geologists met together at one session of the American Association at Philadelphia, and discussed the evidence of the presence of man, presented by the gravels of the Delaware Valley; but

there was great uncertainty in reference to the relics discovered, and still more in reference to the age of the deposits. There seems to be no uncertainty in reference to this skull, and all are agreed that the deposit belongs to the geological period, which followed the last glacial period, thus making the age of man to be, on this continent, 10,000 years.

Fortunately the find came to the knowledge of such geologists as Prof. N. H. Winchell, and Prof. Warren Upham, and Prof. S. W. Williston, soon enough for them to examine the locality, and we are thus spared the uncertainty which has always hung over the Calaveras Skull. No one now claims that the Table Mountain has become a Valley, since the presence of man; though a few years ago that was asserted with a great deal of positiveness.

Another open question which was discussed at this Congress, was the one which relates to the continued contact between the American and the Asiatic continent. New evidence was presented by Waldemar Bogoras, who is a native of Russia, but speaks several languages, and has explored the region along the northeastern shore of Siberia. He finds that the natives of Siberia have myths which are very similar to those on the coast of America. The Sedna myth is common on both continents. He finds also that the languages spoken by the tribes spoken on the Siberian Coast are very different from those of the Mongolian tongue. They show some evidence of being inflected, and differ from agglutinated languages of the Mongolians. The evidence of contact is also presented as we have shown elsewhere, in the similarity of the symbols, especially that of the double headed serpent, which is found upon both continents.

The subject of art and ornament, especially the conventionalism in art, was brought by Dr. Franz. Boaz, and Carl Lumholtz, and others. Mr. C. B. Hartman had a paper on the Archæology of Costa Rica, and Mr. Hjalmar Stolpe had a paper on Swedish Ethnological Work in South America and Greenland; Mr. M. H. Saville had a paper on the Cruciform Structures at Mitla. Other papers were read by Mr. G. A. Dorsey, George Bird Grinnell, W. P. Blake, J. W. Fewkes, Franz Boas, H. I. Smith, A. L. Kroeber, F. W. Putnam, Prof. F. Starr, J. F. Hewitt, Stuart Culin, J. L. Van Panhuys, Stansbury Hagar, J. D. McGuire, F. S. Dellenbaugh, F. W. Hodge.

An interesting paper was also presented by Miss Alice C. Fletcher, on the Star Worship of the Pawnees, which was followed by an account of the Sun Dance of the Pawnees, by Mr. G. A. Dorsey. Mr. Leon Lezeal read a paper on the Peruvian Vases, in which he stated that some of them were as elegant in form as any ever made in old Greece. A familiar figure was a sad feminine face, too singular to be forgotten. This same face was found all over Peru. Dr. Boas spoke of the resemblance between the Siberian natives and those of the

Columbian river northward, and seemed to think there was a race which he called the Behring Race, a position which was confirmed by Waldemar Bogoras.

The exploration of this region has been sustained by gifts from Mr. Morris K. Jesup of New York, who was elected President of the Congress. The Duke de Loubat, has also done much toward the encouragement of the exploration in Central America, and with propriety he was designated Honorary President, and occupied the Chair at the beginning of the Session. The Duke holds that the charge which has been made against the monks, that they destroyed the archives, was not well founded; that the palaces containing them were fired by the Indian allies of Cortez. and not by the Spaniards themselves.

At the close of the sessions at New York, a number of the Americanists took a train for Philadelphia, Washington, Cincinnati and Chicago. They spent two or three days in the latter city. They visited the Field Museum, the University, attended the levy at the President's house, and took a carriage ride, along Michigan Ave., and other parts of the city. They were entertained at the Hotel Del Prado. The majority of them returned to New York by special train, though Mr. and Mrs. Seler took the train for Mexico and Central America. The opportunity for forming acquaintance between the archæologists of the two continents was a good one, and was improved by all.

EDITORIAL NOTES.

VIRCHOW.—The death of this noted man recalls the process through which the science of Anthropology has passed in reaching its present condition, for no other man has been so fully identiffed with it. During the previous century Blumenbach and Camper had directed attention to physical anthropology and the races of man. Virchow also made this his specialty, and took a leading part in forming the society of Anthropology and Ethnology in Berlin.

His studies in prehistoric archæology however brought him into contact with the students in that department and his theory in reference to the descent of man was very conservative as he claimed that the Neanderthal skull was not sufficient to prove the existence of a lower race.

He maintained that different types of man may be combined to form one race as well as one nation.

The gradual introduction of metals into Europe and its effect upon the stone age people was sufficient to solve the problem of the peopling of Europe.

The presence of bronze indicated that the new culture arose in the East but was transmitted to the West.

Virchow's position in reference to the find of the so-called Pithecoid man in Java was also that of a conservative. He showed a rare combination of critical judgment with great diversity of information. The limits of human types do not coincide with the dividing lines of culture and of language, was a fact which he recognized everywhere.

ETERNALISM. A book by this title has been written by Mr. Orlando J. Smith, President of the American Press Association, and takes the ground that the soul of man is by its very nature immortal, eternal uncreatable and indistructable, but by successive incarnations its qualities developed. A doubt comes in however in this connection, for with some souls continued existence brings out the worst qualities. The effects of surroundings do not improve the character. Huxley even says, "the cosmic process has no relation to moral ends." Andrew Lang says, "The universe is a large subject, and we must brace our scaling ladders much more firmly before we can climb the mountain peaks of the Eternal.

A LIBRARY BEFORE ABRAHAM'S TIME.—A library dating back before the age of Abraham has been unearthed in Babylonia by Professor Hilprecht, and presented by him to the University of Pennsylvania, of whose faculty he is a member. It consists of a large number of clay tablets, in excellent preservation, from the Temple of Bel. A partial examination of the tablets leads to the hope that they may throw some new light on the first eleven chapters of Genesis.

JOSEPH PRESTWICH is another of the distinguished men who have passed away within a short time. His name was connected with the discoveries of Broucher de Perthes of 1847. He was awarded a medal by the Society in 1865 for his original researches in the valley deposits yielding weapons of paleolithic man. The study of the drifts of the south of England was important. His views on the primitive character of the flint implements of the Chalk Plateau of Kent, have opened up a new and interesting inquiry as to the age of man. He held to the submergence of western Europe, at the close of the Glacial Period and to the confirmation of the tradition of a flood. He received the honor of Knighthood from Queen Victoria, and was esteemed and beloved by all, and in this respect had the same position in England that Virchow had in Germany.

PRIMITIVE MAN. An article by Talcott Williams in the Annual Report of the Smithsonian for 1896, discusses the question, "Was Primitive Man a Modern Savage?" and argues in the affirmative, holding that the relics of paleolithic man point to his wandering over various parts of the globe. Mr. G. Frederick Wright in a recent article of the *Record-Herald* of Chicago, takes the other side of the question, holding that man in Egypt began with a high state of civilization and degenerated. There is no doubt that the law of progress and degeneracy have both characterized the history of the human race, but the evidence is strong that man began in a very low condition, and perhaps resembled the modern savage; and yet the truth is that the human animal was a prime motor in the progress of the world. He was endowed by the Creator with the capabilities for improvement which when supplemented by the supernatural power have overcome all the tendencies to degeneration.

ISRAEL'S RELIGION, Wellhausen declares, was gradually developed out of heathenism. The mountain and steppe divinity gradually develops into the god of the heavens and earth. Gunkel finds in the Bible, myths indicative of beginnings of religious ideas, Winkler identifies Abraham, Isaac, Jacob, with Babylonian Astral divinities; but recent discoveries in the East have proved that their personal history like that of others, was as real as that of the Egyptian kings, such as Ramses, but their character was in contrast.

COAL.—According to a contributor to Engineering (September 26), the formation of coal may be summarized as follows: Certain plants or trees grow in morasses; they decay and sink; more plants grow on the first layer, and sink in their turn. The weighted down residue decompose through the influence of microbes, with the generation of methane and carbonic acid; and when the decomposed mass is afterwards exposed to high pressure, we find, according to the age of the deposit, peat, lignite, coal or anthracite; graphite does not appear to have the same genesis as coal.

BOOK REVIEWS.

JOURNAL OF THE ASIATIC SOCIETY OF BENGAL. Vol. LXX., Part I: Extra No. 1.—1901. Edited by the Philological Society, Calcutta: Printed at the Baptist Missionary Press, and published by the Asiatic Society. 57 Park Street. 1902.

This number contains a long article on the antiquities from Central Asia, being a Report by A. F. Rudolf Hœrnle, Ph. D. The antiquities consist of manuscripts, some of which were genuine and some fabrications, dating 300 to 700 A. D. The pottery terra cotta objects are very interesting. Many of these have been described by D. Sven Hedin, as they are in his collection. Some of them represent heads and busts, male and female; others masks used as ornaments; others figures made in the round and represent heads and bodies of the horse, boar and bull. They were originally handles for jars which have been broken off, and are quite artistic in their style and finish.

DITTO. Vol. LXX. Part 1. No. 2,—1901.

This contains an article on the symbols and devices on copper coins, by W. Theobald. The symbols are the vine, the threskelis, the hour glass, the lotus, the stupa, the elephant, winged lion, the buffalo, trees with paddle shaped branches, boats, swastika, wheel, trisul, bow and arrow, etc.

HOMERIC SOCIETY. By Albert Galloway Keller, Ph. D. Published by Longmans, Green & Co., 91 and 93 Fifth Ave., New York, London, and Bombay.

This book presents an admirable picture of the Homeric Age, and will be welcomed by all archæologists who desire to know the state of society which prevailed in that age. The first chapter is devoted to the weapons, relics, metals and artifats of the period; the second, to the employments, hunting, fishing, agriculture; the third, the religious ideas and usages; the fifth to the social customs; and the sixth to the government.

The sources of information have been drawn largely from the study of the text rather than the archæological studies, but one who is familiar with the recent discoveries will see the general correctness of the author's position. We can imagine how a book on the same subject illustrated by cuts which would represent the art products of the times, would be welcomed by archæologists, but in the absence of one, the word pictures contained in this book are very suggestive.

WIGWAM STORIES. By Mary C. Judd. Boston, U. S. A. Ginn & Company, Athenæum Press.

Myths and Tales of the Indians are always interesting, but strange to say, are not so well known as those of the nations of the East. This volume, however, entitled "Wigwam Stories," gives them in a brief but attractive way. It begins with a description of the canoes, houses, the wampum, and turns to Indian traits, to the Medicine men, to the Indian totems, Indian names for months, also the Indian games, the pottery vessels, and clay dishes, and then treats of the various Indian stories. The story of the First Man and Woman; Giants and Fairies; The Blue Heron and the Wolf; The Legend of Niagara Falls; Legend of Minnehaha Falls; Legend of Macinaw Island. There are stories about the Magic Moccasins, about Manabozho, about the Pleiades, the North Star, the Thunder Bird, about Hiawatha, all told in a short and entertaining way. Many of the illustrations are taken from photographs and sketches made by a young Indian artist. The book is calculated to interest young people.

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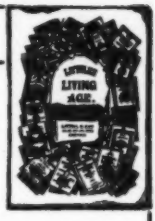

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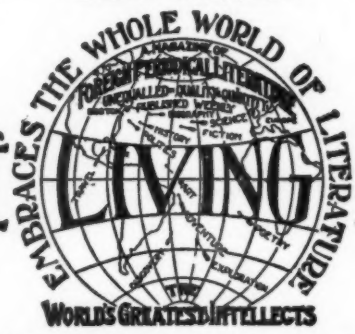

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